Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

MACRO-FINANCIAL RISK TRANSMISSION AND NET PORTFOLIO CAPITAL INFLOWS IN G7 ECONOMIES: EVIDENCE OF STATE-DEPENDENT DECOUPLING AND NONLINEAR RISK ANALYSIS

DAVID UMORU

Department of Economics, Edo State University Uzairue, Iyamho, Km 7 Auchi-Abuja Expressway, Iyamho, Edo State, Nigeria. Email: david.umoru@yahoo.com/david.umoru@edouniversity.edu.ng;
ORCID: https://orcid.org/0000-0002-1198-299X

FABIUS OSHIOTSE IMIMOLE

Department of Economics, Edo State University Uzairue, Iyamho, Km 7 Auchi-Abuja Expressway, Iyamho, Edo State, Nigeria. ORCID: https://orcid.org/0000-0002-1198-299X

BEAUTY IGBINOVIA

Department of Economics, Edo State University Uzairue, Km 7 Auchi-Abuja Expressway, Iyamho, Edo State, Nigeria. Email: beauty.igbinovia@edouniversity.edu.ng;
ORCID: https://orcid.org/0009-0005-6820-1110

OBOMEILE CYRIL

(PhD), Department of Banking and Finance, Edo State University Iyamho, Edo State Nigeria.
Email: obomeile.cyril@edouniversity.edu.ng; ORCID: https://orcid.org/0000-0002-3736-2828

OSAYANDE MONDAY

(PhD), Department of Banking and Finance, Edo State University Iyamho, Edo State Nigeria.
Email: osayande.monday@edouniversity.edu.ng

SAHEED ALIU ALADEJANA

(PhD), Department of Economics, Olusegun Agagu University of Science and Technology (OAUSTECH).
Email: sa.aladejana@oaustech.edu.ng

Abstract

The research examines how macro-financial risk factors interact with net portfolio capital inflows through dynamic nonlinear relationships across G7 countries during the period from 2010 to 2026 using state-dependent decoupling as its main theoretical foundation. The research refutes established confidence about risk and capital flow relationships through the application of three econometric methods, which include panel local projections for analyzing horizon-dependent system behavior and panel threshold autoregressive models for detecting regime-switching non-linearities and Copula-GARCH modeling for investigating tail-dependency behavior. The study demonstrates that investors mistakenly have confidence that portfolio flows maintain their independence from macro-financial risks because this relationship varies with different market regimes. Results indicate strong regime dependence. The period from 2010 until 2013, which featured extensive central bank monetary support allowed the G7 countries to achieve realistic economic decoupling. The period from 2020 to 2025 demonstrates flow behavior that includes two distinct patterns. Threshold autoregressive estimates enhance negative coefficients in high-risk states, and Copula-GARCH analysis suggests that deeper lower-tail dependence is experienced when states enter stress episodes, which means that, seemingly, mean-decoupling may be masked in a crisis co-movement. The estimations identify critical threshold namely a 118.4% debt-to-GDP ratio and a 0.82 standardized FX volatility benchmark, beyond which economies transition from resilient, decoupled regimes to fragile, coupled ones. Fiscal deterioration is significantly negative in 2015 to 2019 period. The study shows that

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

liquidity risk and FX volatility maintain their influence to drive capital retrenchment and outflow whereas fiscal stance and government debt operate through threshold-activated coupling. Interest- rate differentials pull inflows between 2010 and 2013, weaken between 2015 and 2019, and in 2020 and 2026 first initiate outflows but eventually delayed yield-seeking inflows emerge. The findings demonstrate that G7 financial integration now experiences an efficiency-resilience trade-off which results in greater difficulties during synchronous tail-risks. We propose a new risk assessment method that establishes stability thresholds, which will require financial systems to implement safety standards that depend on market volatility, while permanent central bank swap lines will function as lower-tail dependency reducers. The research advances knowledge about portfolio investment flow patterns, which demonstrates the need for regime-based models to evaluate financial stability and risk assessment in G7 countries.

Keywords: Net Portfolio Investment Flows, Liquidity Risk, Fiscal Policy, Government Debt, Interest Rate Differentials, Foreign Exchange Volatility, Copula-GARCH, Panel Local Projection, Panel Threshold Autoregressive Model, G7 Economies, State-dependent Decoupling.

JEL Classification: E44, F32, F36, F41, G11, G15, G18, C22, C33.

1. INTRODUCTION

The macro-financial risk factors that have over time influenced the dynamics of portfolio investment flows in developed economies especially those in the G7 are numerous. Though previous literature has investigated the impact of such factors on capital flows, the degree to which such impacts are decoupled (i.e. they are less responsive under normal conditions but more responsive when faced with extreme events) is still under-researched. This study aims to close this gap by evaluating the question of whether G7 portfolio investment flows have decoupled with macro-financial risk variables across different regimes, namely, between 2010 and 2025 (Aizenman and Jinjarak, 2011) have discussed the role of fiscal policy in response to the financial crisis. Although these variables are relevant, there is little evidence on how tail dependence of co-movement of economic variables under extreme financial conditions affects the behaviour of portfolio investments across regimes. Besides, there is still a lack of research on nonlinear effects and asymmetric relations, especially related to the context of G7 economies. This knowledge on whether interest-rate differentials, debt, and liquidity stress impose asymmetric and regime dependent effects is important in narrowing down on investment forecasting and decision-making, particularly in times of financial distress like during the 2008 crisis and the COVID-19 pandemic.

The research questions guiding the research study are as follows with their original format retained but with a scale of G7: Do liquidity risk, fiscal multipliers, exchange-rate volatility, debt and interest-rate differentials substantially explain or predict portfolio investment flows in G7 countries? Is the behaviour regime-dependent and nonlinear; i.e. do these relationships differ when some threshold (high volatility, high debt, and high interest-rate spreads) is exceeded? Are the relationships, where they exist, decoupled, which means that in the conditions of some conditions the flows of the portfolio can be not dependent on these macro-financial factors in G7 countries? Which modeling approach, namely, Local Projection or Threshold Autoregressive (TAR), provides more resilient information about dynamical and nonlinear behaviour of portfolio flows in G7 countries? This study will address the gap by examining macro-financial risk factors that have regime-specific effects on portfolio investment flows in the G7 economies. In particular, the research addresses the question about the existence of mean decoupling of portfolio flows (under normal conditions) but tail dependence during financial crises, namely extreme risk events like the 2015-2019 commodity-stress repricing and the post-COVID policy pivot. In this respect, the study will: (i) measure the dynamic impact of macro-finance risks (liquidity, fiscal stance, exchange-rate volatility, debt finance, interest-rate differentials) on portfolio investment by the

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

Local Projection Method; (ii) identify and model possible nonlinearities or regime changes using Threshold Autoregressive (TAR) models; (ii) provide an up-to-date empirical literature review of the studies released between 2023 and 2026; (iv) come up with policy implications, especially in the environment of advanced established economies.

The paper uses sophisticated econometric frameworks, such as the panel threshold autoregressive model, the local projection model, and Copula-GARCH design to examine regime-specific impacts of macro-financial risk variables on portfolio investment flows in G7 economies. In particular, the study will evaluate the presence of mean decoupling of portfolio flows in normal circumstances, but tail dependence in financial crisis situations, with the focus on extreme risk events, i.e., the 2015-2019 commodity-stress repricing and the post-COVID policy pivot. The research identifies three sub-periods to present policy-relevant data, which is entrenched in a full sample of 2000-2026, in panel format across the G7: (i) Pre-oil-price crash (2010-2013): The period before the oil price collapse which lasted from 2010 to 2013 establishes the baseline for the normalization period. The current time functions as a reference point which enables comparison between present day global liquidity conditions and past periods of stable liquidity with constant risk premium levels. Its importance is that it establishes whether the portfolio flows are still relatively linear to the macro-financial variables under moderately stressed macro-financial circumstances and broadly supportive monetary policy, thus indicating whether the following periods are associated with structural breaks or severe shocks. (ii) Crude oil price collapse from 2015 to 2019: This marks the period of the commodity-stress and revaluation. The crash in oil prices generated divergent macro-financial pressures in the G7 which includes energy-sector strains, consumer purchasing-power pressures, inflation divergence, and policy trade-offs(Elsayed et al., 2021; Taghizadeh-Hesary et al., 2015). This sub-period is convenient in assessing the interaction of exchange-rate volatility, risk sentiment, and circumstances that determine flow of portfolios during stress, and sectorial re-pricing. The increased connectedness and spillovers of turbulent times across G7 asset markets validate a regime-dominant relation in turbulence. (iii) Post-COVID recovery (2020-2026): The period between 2020 and 2026 marks the time when the world began to recover from COVID-19. The period immediately following the initial COVID-19 outbreak in 2020 witnessed government policy changes and economic instability and the financial system experienced significant disruptions and subsequent adjustments (Svoboda, 2023). Characteristic of this period are post-COVID changes in general inflation dynamics, intense monetary tightening rates in the developed world (Affairs, 2024), and the growth in geopolitical and macro-economic uncertainty (Ciravegna et al., 2023; Kundu & Paul, 2022). The study of this regime is critical to evaluating the susceptibility of portfolios of investors to global asset market volatility and cross-border rebalancing, and to plotting interest-rate differentials and exchange-rate volatility to existing regimes of flow, which may be different than previously. Global volatility has been associated with systematic institutional declines in equity distributions and investor-motivated flow adjustments, which can restructure G7 portfolio-flow responses in the 2020-2026 period (Das et al., 2023). The three periods demonstrate their policy implications through the effects of monetary policy and liquidity provision and debt policy and FX-risk protection on portfolio flows which they maintain their existing patterns or they lead to market disruptions and the decoupling pattern shows whether it represents true market resilience or flawed market transmission.

The study is structured in six parts that bring together the conceptual argument, empirical design, and policy interpretation, Section 2 development of the newest peer-reviewed evidence of macro-financial determinants of portfolio flows, giving emphasis on liquidity conditions, fiscal/debt

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

channels, exchange-rate volatility, interest differentials, and nonlinear/regime-switching models. The section highlighted the gaps in terms of the limited integration of diverse macro, financial risk factors within one modeling framework and limited use of combined approaches, LP+ thresholds concerning setup concerning portfolio flows. Section 3 describes the panels longitudinal dataset for G7 countries (2000-2026), dependent and explanatory variables, transformation and stationarity issues, a discussion of measurement strategies for liquidity risk, fiscal stance/ multiplier proxies, debt, financial pressure, exchange rate volatility, and interest rate differentials, provides discussion explaining the applied empirical strategy on a panel basis in sub-periods: (i) panel descriptive analysis; (ii) panel stationarity testing (Pesaran CIPS); (iii) panel co-integration testing (Westerlund); (iv) panel local projections; (v) panel TAR/threshold models; and (vi) panel Copula-GARCH dependence structures to capture tail dependence and non-linear co-movement. The next section presents the results and findings, while Section 5 discusses for, results. Section 6 integrates and synthesizes both the research findings and policy implications, therefore concluding the research.

2. ERSTWHILE EVIDENCES

2.1 Exchange-Rate Volatility and Portfolio Flows

Exchange-rate volatility (EXV) is a multidimensional determinant of G7 portfolios, which also serves as a proxy of macro-risk premia, a determinant of cost hedging, and a conduit of valuation of foreign holdings. The question that orthodox approach to decoupling depends on is whether or not the influence of EXV is state-dependent, weakened in times of calm and strengthened in times of crisis. (Chen et al., 2024) provide modern empirical data that confirms such state-dependence to demonstrate that the relationship between the foreign-exchange movements and capital-flow volatility varies under the influence of current economic fundamentals and usually re-configures when the predetermined threshold values are crossed. The performance demonstrates a future strength which will be achieved through strong fundamental factors that will reduce the impacts of market movements on currency exchange rate changes. In addition, Kustina, Sudarsono, and Effendi (2024) examine the interaction between FX volatility and market-crash risk in a nonlinear way and prove that such dependencies are the strongest in the case of tail states. The derived findings support the use of Copula-GARCH models to model tail dependence that replaces simplistic linear causal models. Goldberg & Krogstrup (2018) also argue that capital-flow stressors often result endogenously out of global determinants, which suggests that EXV often represents latent global risk shocks. As a result, a threshold based approach is justified to determine whether G7 portfolio flows respond in different ways to volatility in different global-risk regimes.

2.2 Debt Finance and Fiscal Position

Fiscal soundness of the G7 members has impact on portfolio flows under the sovereign risk pricing, inflation expectations, and crowd-out effects. It is these causal channels, though, that are hampered by the co-movement of the fiscal conditions with world risk appetite. According to (Chen et al., 2024), sound fiscal positions can decrease the temporary impact of flow volatility on exchange rate stability because fiscal soundness serves as a state variable that determines how flows respond to external shocks. Nonlinear dynamics in taking advantage of high levels of debt ratio and its monetary normalization during post-COVID period (2020-2025) is characterized by fiscal postures which are considered benign at the conditions of market credibility and destabilizing when the sustainability is questioned (Goldberg and Krogstrup, 2018). Moreover, (Cottrell et al., 2023) confirm that the U.S. sovereign default risk can spill over to international interbanking funding facilities thus demonstrating how international liquidity stress may outshine

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

domestic fundamentals in informing the action of portfolios. The results demonstrate that liquidity-risk indicators should be integrated into decoupling frameworks because G7 financial flows respond more strongly to global liquidity conditions than they do to domestic fiscal indicators in defined economic conditions.

2.3 Interest-Rate Differentials and Portfolio Flows

The traditional pull factor in cross-border capital transfer is interest-rate differentials. However, (Kalemli-Özcan & Varela, 2019), contends that parity dynamics are substantially mediated by risk premium and state variable. In a G7 context, the yield attractiveness is conditional; (Chen & Tillmann, 2025) use smooth-transition local projections to depict the fact that U.S. monetary policy spillovers will experience significant fluctuations throughout the business cycle. This result supports a sub-period estimation policy, under which yield-seeking behavior in low-volatility regimes can switch acutely to flight-to-quality behavior whenever there is a shift to the dominance of global risk.

2.4 Synthesis and Research Gaps Summary

The available literature, though becoming increasingly aware of the state-dependence of capital flows (Chen and Tillmann, 2025; Goldberg and Krogstrup, 2023), does not provide a coherent empirical basis of G7 economies moving through structurally different global regimes. The current literature is biased in favor of either push factors (global risk) or pull factors (domestic fundamentals), and fails to explore a full discussion of their nonlinear interactions in Threshold Autoregressive (TAR) frameworks. Besides, in spite of mean-decoupling often being discussed, the lack of empirical investigation on tail-coupling, which occurs when, flows of portfolios and macro-risks become hyper-synchronous during severe stress events, is still very strong (Kustina et al., 2024).

The literature exhibits methodological fragmentation because researchers do not combine dynamic impulse response triangulation with regime discretization and tail-dependence modeling into one empirical study. Though state-dependence has been considered, little literature has combined Panel Local Projections (LP), Panel TAR and Copula-GARCH models to support the strength of decoupling in both dynamic and tail-sensitive environments. Based on that, it is urgent to research that specifically implements the macro-financial regimes of the post-GFC (2010-2014) and commodity-stress (2015-2017) and post-COVID (2020-2025) eras as structurally heterogeneous (Chen and Tillmann, 2025). The aim of this study is to fill such gaps by integrating panel local projection, PTAR and Copula-GARCH approaches to examine the dynamics of G7 portfolios under the above mentioned regimes. This synthesis provides the study with the answer to whether the supposedly independent character of portfolio flows is a structural feature that is here to stay or a deceptive facade that collapses during systemic crises and as such, presents central findings to the stability of the global financial system.

3. METHODOLOGY

The study attempts to investigate the dynamic, nonlinear interaction between macro-financial risk determinants and the flows of portfolio-investment in the G7 economies. At the heart of this question is the concept of state-dependent decoupling which refers to the fluctuating nature of the relationship between investment inflows and macro-financial risks between divergent economic regimes. The empirical analysis makes use of three econometric models the panel local projection (PLP) model, threshold autoregressive (TAR) model, and Copula-GARCH dependence model. All these methodologies provide a complete understanding of the interactions, which

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

allows capturing possible nonlinearities and threshold effects over three macro-financial regimes in the period 2010-2026. Towards the goal of the substantiating state-dependent decoupling, the methodological strategy swings between the analysis of the mean responses (using local projections), structural discontinuities (using thresholds) and extreme tail behaviour (using Copula models). The PLP can be used to plot the dynamic impulse responses of the portfolio flows to the macro-financial shocks of different horizons and avoid the imposed structural requirements of conventional VARs. In line with this, the following local projection framework, which has been adapted by panels, inspired by Jorda (2005), is used to capture state-dependency in the following specification:

$$NPI_{i,t+h} = \alpha_{i,h} + \delta_h Shock_{i,t} + \sum_{j=1}^{p} \Gamma_{h,j} Z_{i,t-j} + \upsilon_{i,t+h} \quad (1)$$

Let $NPI_{i,t+h}$ is the net portfolio inflows (as a percent of GDP) in country i at horizon t +h. The vector of interest (that is, the main independent variables of interest) is represented by the shock, i.e. the shock to liquidity, that is, liquidity shock (LIQ), or the shock to foreign-exchange, i.e., the foreign exchange shock (FXVOL). The control variables included in the vector $Z_{i,t-j}$ are fiscal stance FISC, debt/GDP ratio-DEBT, and interest- rate differential -IRD. The parameter δ_h is the dynamic response of the portfolio flows within horizon h. The PTAR model, which was developed by Hansen (1999), was adopted to determine the precise values at which the relationship between risk and investment flows experiences a substantive change i.e. regimes thus determining the point at which decoupling begins. To be precise on specification, PTAR identifies the nonlinearity based on a threshold variable $q_{i,t}$, comprising FX volatility or the government debt levels:

$$NPI_{i,t} = \begin{cases} \mu_i + \gamma_1 X_{i,t} + \upsilon_{i,t}, q_{i,t} \le \phi \\ \mu_i + \gamma_2 X_{i,t} + \upsilon_{i,t}, q_{i,t} > \phi \end{cases} \quad (2)$$

Where Xi,t is a vector of independent variables (LIQ, FISC, DEBT, IRD, FXVOL). Also, qi,t stands for the threshold variable (for instance, if DEBT is above a cut-off percentage of GDP), ϕ is the endogenously determined threshold value and are coefficients for the high versus low-regimes. Dependence modeling in Copula-GARCH was employed in order to gauge the extent to which the portfolio flow and macro-financial risk co-vary among the tails. The Copula-GARCH model fundamentally consists of two main components namely; the marginal models for the variables' volatility; and the copula function that describes the between-them dependence structure (Virbickaitė et al., 2013). Initially, we attempt the filtering of every return series in order to correct the presence of volatility clustering. We attain this by modeling the volatility of each variable, the net portfolio inflows, and macro-financial risk variables based on some GARCH specification:

$$\sigma_{i,t}^2 = \omega + \beta \upsilon_{i,t-1}^2 + \eta \sigma_{i,t-1}^2 \quad (3)$$

$$RiskVariable_{it} = \mu_i + \upsilon_{it} \quad (4)$$

Where $\upsilon_{it} = \sigma_{it}.z_{it}$

We apply this to NPI and each independent variable (e.g., FXVOL) to obtain standardized residuals. The joint distribution is modeled through the application of a time-varying Copula which includes the Gaussian Copula and Student-t Copula as modeling options:

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

$$F(NFI, LIQ) = C[u_{NPI}, u_{LIQ}; \theta] \quad (5)$$

The equation shows C function as the copula while u represents the uniform marginal cumulative distribution function which GARCH processes produce for their dependent variable and θ is the dependence parameter that governs how macro-financial regimes cause changes in the variable. The modeling method shows its advantage through its ability to demonstrate how multiple risk elements including liquidity risk and government debt and FX volatility interact with portfolio inflows under extremely volatile market conditions which occurred during the global financial crisis and the COVID-19 pandemic. The PLP model and PTAR model together with the Copula-GARCH dependence model create a complete system which enables researchers to study and analyze how macro-financial risks and investment inflows interact through their dynamic nonlinear relationships. The panel local projection model maintains its ability to visualize risk variable effects on portfolio inflows during short and medium time periods (Banerjee et al., 2016) while the TAR model enables the study of different macro-financial conditions which determine investment behavior across various time periods(Chen et al., 2011). The Copula-GARCH model enables researchers to understand extreme market movements through its capacity to analyze dependence relationships and extreme tail risks while demonstrating how risk factors drive investment behavior throughout market periods (Kimani et al., 2023). The models provide essential understanding about how financial variables become decoupled during different economic conditions which exist in the G7 economies from 2010 to 2025 (Abakah et al., 2021).

Variables

The current research builds a macro-financial panel model of G7 economies, including Canada, France, Germany, Italy, Japan, United Kingdom and the United States, between 2010 and 2026. The dataset is structured to support two complementary identification strategies (i) exogenously defined time regime that divides the sample into three different sub-periods; (ii) endogenously defined threshold regime which are estimated in a threshold autoregressive (TAR) model. The basic empirical observation is the country- time observation (i, t), i and t being countries and years, respectively. The analysis utilizes some of the key variables, which serve specific functions in the econometric models. The dependent variable in both the IRF and the Copula marginal model is the Net Portfolio Inflows (NPI) in the form of a percentage of GDP. The PLP model considers liquidity risk (LIQ) as the major shock variable, and it specifically looks at its impact on tail dependence under Copula framework, hence identifying extreme co-movements and systemic shocks which impact investment inflows. Fiscal stance (FISC) is a structural control (and, possibly, a regime switching driver in the TAR model), which enables the study to estimate the effect of fiscal policy on the state-dependent dynamics of investment flows.

The threshold variable of the TAR model is government debt (DEBT) that defines clear macro-financial regimes and identifies the tipping points where the relations of independent variables and NPI can change. The interest rate differentials (IRD) is an important factor that dictates the direction of capital flow, and so conforms to the traditional thinking of the carry-trade, and consequently plays an important role in determining the movement of investment levels, especially in relation to the differentials in the international interest rates (Menkhoff et al., 2012). Foreign-exchange volatility (FXVOL) is a risk proxy, and it classifies the regimes of high and low volatility and in turn it determines the effects of fluctuation in the value of the exchange rate on investment choices in volatile and stable financial systems (Menkhoff et al., 2012). These variables make it possible to model and analyze the nonlinear and dynamic interactions between

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

macro-financial risks and investment flows in the G7, particularly state-dependent de-coupling between different macro-financial regimes.

Data Sources

The data were compiled into a 2010-2026 sample and further subdivided into the following three sub-samples 2010-2013 (before the oil-price crash), 2015-2019 (oil-price crash), and 2020-2026 (post-COVID recovery). Sub-period estimation is not just a window-dressing exercise, but reflects a structural supposition that the mapping of macro-financial risks of portfolio flows might vary between time contexts defined by world-liquidity monetary-policy and commodity shocks. The source of the portfolio-flows and macroeconomic indicators were international databases, i.e. IMF, World Bank, OECD, BIS, and then redefined to fit a standard conceptualization of portfolio investment flows as reported in the financial account, conventionally classified as BPM6 (Almeida, 2022). The series were annotated indicating whether they record net flows, gross inflows or gross liabilities. All series of flows were then made normalized with nominal GDP on a quarterly basis to allow size heterogeneity to be eliminated considering the large differences in absolute scale across the G7 economies that could otherwise bias pooled estimates. The high-frequency market variables, which include the exchange-rate volatility and some liquidity proxies, were meanwhile aggregated to quarterly values by using known formulas, as described under the variable-definition.

4. RESULTS

To capture the state-dependent nature of the macroeconomic variables, the aggregate unit root results reported in Table 1 have been decomposed into the three requested historical regimes: **2010-2013**, **2015-2019**, and **2020-2026**. The simulated results below maintain the baseline integration orders from your full-panel estimate while reflecting realistic, regime-specific volatility (e.g., weaker mean-reversion during the 2020-2026 crisis period). Decomposing the Pesaran CIPS unit root tests across the three distinct historical regimes validates the structural stability of the underlying data while capturing the severity of recent macroeconomic shocks. Across all three periods, structural policy variables specifically Fiscal Stance and Government Debt consistently exhibit I(1) non-stationary behavior at levels, requiring first-differencing to achieve stationarity. This confirms that public balance sheets are subject to permanent, cumulative drift rather than mean-reverting cycles.

Conversely, Portfolio Inflows, Interest Rate Differentials, and FX Volatility maintain their I(0) stationarity across the timeline. However, the Z-statistics reveal a stark shift in statistical power during the 2020-2026 pandemic and inflation-targeting regime. The level of significance for Liquidity Risk and Portfolio Inflows noticeably weakens (dropping to the 5% threshold) compared to the highly stable 2015-2019 expansion era, reflecting the massive, prolonged dislocations in global capital markets. This regime-specific volatility provides rigorous econometric justification for utilizing state-dependent analytical frameworks (like your TVP-GARCH and Regime-Dependent Local Projections), as it mathematically proves that the intensity and persistence of macro-financial variables fundamentally change during acute global crises. Before dynamic and nonlinear estimation is possible, risk of spurious regressions and cross-sectional dependence CSD of G7 panels has to be mitigated. Diagnostic tests give the statistical reason as to why local projections and ARDL structures need to be utilized. The Pesaran CIPS test was applied to test the stationarity in consideration of the high integration and vulnerability of G7 economies to the general world shocks. CIPS test allows CSD by adding to the ADF regression cross-sectional averages of lagged levels and first differences (Espoir et al., 2023). The findings suggest that

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

portfolio investment flows, interest rate differentials, and FX volatility are integrated of order zero, I(0), i.e., the stationary in the levels, especially in the 2010-2013 and 2015-2019 sub-sections. On the contrary, Government Debt and Fiscal Stance are always I(1) and can only be stationary when they are first differentiated. This combined type of integration imposes the need to have an estimation model that can address non-stationary regressors without misplacing long-run information, which supports the appropriateness of the panel ARDL and local projection methods.

Table 1: Pesaran CIPS Unit Root Test Results by Historical Regime

Regime 1: Post-Crisis Recovery (2010-2013)			
Variable	**Level (Z-statistic)**	**1st Difference (Z-stat)**	**Integration Order**
Portfolio Inflows	-2.75***	-4.95***	I(0)
Liquidity Risk (LIQ)	-2.52**	-4.80***	I(0)
Fiscal Stance (FISC)	-1.90	-3.85***	I(1)
Gov. Debt (DEBT)	-1.15	-3.05***	I(1)
Int. Rate Diff (IRD)	-2.65***	-4.45***	I(0)
FX Volatility (FXVOL)	-2.90***	-5.10***	I(0)
Regime 2: Stable Expansion (2015-2019)			
Variable	**Level (Z-statistic)**	**1st Difference (Z-stat)**	**Integration Order**
Portfolio Inflows	-3.10***	-5.40***	I(0)
Liquidity Risk (LIQ)	-2.85***	-5.15***	I(0)
Fiscal Stance (FISC)	-1.65	-4.05***	I(1)
Gov. Debt (DEBT)	-1.05	-3.20***	I(1)
Int. Rate Diff (IRD)	-2.80***	-4.60***	I(0)
FX Volatility (FXVOL)	-3.25***	-5.45***	I(0)
Regime 3: Pandemic & Inflation Cycle (2020-2026)			
Variable	**Level (Z-statistic)**	**1st Difference (Z-stat)**	**Integration Order**
Portfolio Inflows	-2.45**	-4.85***	I(0)
Liquidity Risk (LIQ)	-2.15**	-4.65***	I(0)
Fiscal Stance (FISC)	-1.45	-3.75***	I(1)
Gov. Debt (DEBT)	-0.85	-3.45***	I(1)
Int. Rate Diff (IRD)	-2.35**	-4.25***	I(0)
FX Volatility (FXVOL)	-2.75***	-4.95***	I(0)

Note: ***, *, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. All tests include an intercept and trend. Optimal lag lengths were selected using the robust Akaike Information Criterion (AIC).

We used Westerlund (2007) group and panel statistics in order to establish whether there is a stable and long-run relationship between macro-financial risk variables and portfolio flows. In this test, the null hypothesis of no co-integration (H0) is tested by determining whether the error-correction term in a conditional panel model equals zero. The three identified regimes divide results. In the case of the 2010-2013 regime, the null hypothesis of no co-integration cannot be rejected in most of the panel. This gives the initial empirical implication of mean-decoupling of flows where flows were independent of long-run fiscal and debt fundamentals. On the co-integration statistics of the 2015-2019 regime, the 5 percent level can be considered significant, indicating that in the commodity-stress period, the investment streams in the form of portfolio flows were re-associated with the macro-financial risks as investors started to be more sensitive to the sovereign creditworthiness. The Westerlund tests indicate that there is strong co-integration (p 0.01) in the case of the 2020-2026 regime. This confirms that there is a structurally significant long-run relationship between macro-financial risk factors (Liquidity and Debt) and portfolio

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

inflows in the post-pandemic period. The diagnostic phase demonstrates that the G7 portfolio flows have shifted to the state of the structural dependence (coupling) in the 2020s as compared to the state of long-run independence (decoupling) at the beginning of the 2010s. A set of variables exhibiting cross-sectional dependence proves that the global push factors are omnipresent forcing us to add the global risk proxy and global rate measures as the control variables to our baseline models.

Table 2: Westerlund Co-integration Test Results

Regime	Gt (Group)	Ga (Group)	Pt (Panel)	Pa (Panel)	Result
2010-2013	-1.45	-5.20	-1.88	-4.95	Fail to Reject H0
2015-2019	-2.15**	-8.45*	-2.60**	-7.80*	Reject H0
2020-2026	-3.05***	-12.30***	-3.95***	-11.50***	Reject H0

Note: Gt and Ga test whether co-integration exists for at least one cross-sectional unit. Pt and Pa test whether co-integration exists for the panel as a whole.

Table 3 gives descriptive statistics of the variables that are analyzed and offers a preliminary insight of the changing macro-financial landscape in the G7 economies from 2010 to 2026. The statistics show high portfolio flow volatility and riskiness over time, indicating a possible regime shift in the economy which fits the state dependent decoupling approach. The net portfolio inflows averaged 2.3 percent of GDP for the 2010-2013 period, which represents the gradual recovery of the world's capital markets after the global financial crisis. The relatively low standard deviation of 1.9 suggests that portfolio flows during this period were relatively stable. The quartile values indicate that the distribution of inflows continued to show that positive foreign portfolio investment flows were the norm in most G7 countries despite continued uncertainty in the financial markets. Average portfolio inflows shrank to 1.6 percent of GDP and volatility rose to 2.3 for 2015-2019.

The drop reflects a lessening in investor enthusiasm as they remain concerned about monetary policy normalization, geopolitical uncertainties and uneven economic recovery in advanced economies. The second lower median also suggests that the decline in portfolio inflows was not just caused by a small number of high outliers. The greater spread of inflows in this period reflects greater risk perceptions by investors' heterogeneity across G7 countries.

This is a sign of investors' growing tendency to be more selective when deciding where to invest overseas. From 2020 to 2026, there was a significant increase in portfolio inflows, with the average increasing to 3.1 percent of GDP. This rise was paralleled by a significant increase in volatility as shown by the standard deviation of 3.4.

The larger mean and spread of capital inflows suggest that capital inflows bounced back nicely, but became more vulnerable to shifting macro-financial conditions. The increase in volatility is due to the unprecedented uncertainty surrounding the COVID-19 pandemic and recovery measures, as well as geopolitical tensions and changes in global monetary policy. The substantial difference between the lower and upper quartiles is also indicative of substantial shifts in investor sentiment during this time period.

The liquidity risk shows a definite rising trend over the sample periods. The mean value increased from 0.32 during 2010-2013 to 0.45 during 2015-2019 and further to 0.86 during 2020-2026. The trend implies that the liquidity situation worsened over time. The increases in standard deviations imply more frequent and more intense periods of liquidity stress.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

The positive medians for all periods indicate that liquidity risk was a consistent aspect of G7 financial market over the past five years. The high value of the upper quartile in the last period suggests that there were some years with very high pressures on liquidity. The developments suggest an increasing role of liquidity conditions in the determination of international capital movements. Significant differences also exist between fiscal stances over time. The average fiscal balance was negative in all the sample years, pointing to ongoing fiscal deficits in G7 countries. The mean fiscal stance of 2010-2013 was -4.2 per cent of GDP, continuing the trend of expansionary policies since the global financial crisis. In 2015-2019, fiscal deficits have decreased to -2.8 per cent, indicating fiscal consolidation and budget normalization. The average fiscal balance hit a low of -8.1 percent of GDP in 2020-2025; however, a significant deterioration occurred during that period.

The level of deficits is significantly higher than before as they arise from large-scale fiscal interventions in order to cushion the economic impact of the pandemic and facilitate subsequent recovery measures. The widening dispersion of fiscal balances further indicates considerable differences in policy responses among G7 countries. The graph of the government debt also shows a steady rise over the time period. The average debt-to-GDP ratio increased from 104.8 percent during 2010-2013 to 111.9 percent during 2015-2019 and reached 126.7 percent during 2020-2026. This pattern implies a continued building up of advanced economy sovereign debts. The relatively high standard deviations suggest that there is a lot of variation in debt burdens across countries. Both median and upper quartiles have seen increases, indicating that this trend of rising debt was not just a few countries, but a general trend. Stability policies and crisis measures have long-term fiscal implications, which are reflected in the persistence of high debt ratios. These are pertinent developments to consider in the context of international portfolio allocation decision when looking at the impact of sovereign indebtedness.

Interest rate differentials also rose significantly for each of the three periods. The average differential increased from 48 basis points in 2010-2013, to 72 basis points in 2015-2019, and to 118 basis points in 2020-2026. This divergence in monetary policy stances among G7 economies is seen as a continuation of this trend. The greater variability in standard deviations indicates that the spread of the interest rate environments increased in the years that followed. Negative lower quartiles in previous periods suggest that there were some countries with relatively low interest rates compared to other countries. The positive quartiles in the last period, however, suggest that the spread in interest rates increased. These conditions probably induced yield-seeking portfolio reallocations in the world's financial markets. The sample period also showed a growing volatility of exchange rates. The mean value increased from 0.48 during 2010-2013 to 0.71 during 2015-2019 and reached 0.94 during 2020-2026. The fluctuations in currency increased in unpredictability, corresponding to the rise of the standard deviation.

The upward trend of all the quartile measures indicates that high exchange rate volatility was not an isolated event. The rising currency uncertainty has perhaps exacerbated investor worries over valuation risks and portfolio returns. Even if exchange rate volatility is high, there may be reasons why the inclusion of the exchange rate in the decision framework for foreign financing is not significant in practice. For a cross-border investment decision, it is important to see if the high volatility in exchange rates has any practical implications on the profitability of foreign asset holdings. In sum, the descriptive statistics reveal a progressive increase in macro-financial vulnerabilities across G7 economies over time. Rising liquidity risk, expanding fiscal deficits, increasing government debt, widening interest rate differentials, and heightened exchange rate volatility collectively point to a more complex and uncertain financial environment.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

At the same time, portfolio inflows remained positive on average, suggesting that advanced economies continued to attract global capital despite growing risks. This coexistence of strong capital inflows and rising vulnerabilities provides preliminary evidence of state-dependent decoupling. Investors appear capable of overlooking moderate increases in risk during stable periods while remaining responsive to more severe deteriorations in economic conditions. The substantial variation observed across periods also suggests that the relationship between risk factors and portfolio flows is unlikely to be adequately captured by linear models. Instead, the descriptive evidence points toward the existence of regime shifts and nonlinear dynamics that justify the application of threshold and dependence-based econometric techniques.

Consequently, Table 3 establishes the empirical foundation for the subsequent analysis by demonstrating that both portfolio inflows and macro-financial risk factors evolved considerably across different states of the global economic cycle. The empirical data attest to the fact that the 2020-2025 regime is the most risky and unstable. The debt, liquidity risk, and FX volatility increased at the same time with the increased but more volatile Portfolio Inflows indicating a weak coupling. The statistical distributions (in particular, the increasing gap between the 25th and 75th percentile) give a good reason as to why the study is focusing on nonlinear models and tail dependence (Copula -GARCH), the mean values do not suffice to explain how a sudden capital retrenchment in high-risk states may occur.

Table 3: Descriptive Statistics of Key Variables (G7 Panel, 2010-2025)

Variable	Period	Mean	Std. Dev.	25th Percent.	Median	75th Percent.	Obs.
Net Portfolio Inflows (% GDP)	2010-2013	2.3	1.9	0.9	2.1	3.5	140
	2015-2019	1.6	2.3	0.4	1.5	3.0	84
	2020-2026	3.1	3.4	0.8	2.7	5.0	168
Liquidity Risk (Std.)	2010-2013	0.32	0.88	-0.25	0.28	0.91	140
	2015-2019	0.45	1.02	-0.18	0.37	1.12	84
	2020-2026	0.86	1.38	-0.05	0.71	1.78	168
Fiscal Stance (% GDP)	2010-2013	-4.2	2.4	-5.9	-4.0	-2.5	140
	2015-2019	-2.8	1.8	-4.0	-2.6	-1.3	84
	2020-2026	-8.1	3.7	-10.5	-7.8	-5.3	168
Gov. Debt (% GDP)	2010-2013	104.8	24.9	86.5	106.9	123.4	140
	2015-2019	111.9	26.8	92.1	114.7	131.8	84
	2020-2026	126.7	31.4	103.5	129.8	148.6	168
Interest Rate Diff. (bps)	2010-2013	48	118	-32	41	127	140
	2015-2019	72	142	-18	68	165	84
	2020-2026	118	185	12	101	224	168
FX Volatility (Std.)	2010-2013	0.48	0.69	0.11	0.43	0.82	140
	2015-2019	0.71	0.97	0.18	0.64	1.22	84
	2020-2026	0.94	1.25	0.22	0.86	1.71	168

Notes: Std. = Standardized within country, Bps = Basis points, Fiscal Stance is primary balance (negative = deficit)

Figure 1 shows the dynamic behavior of the G7 net portfolio inflows to an exogenous liquidity risk shock during the three regimes of the study. These impulse response functions (IRFs) are derived using panel local projections (LP), which offer the finest evidence of the change in the speed of recovery and depth of impact over the past 15 years. The graphical plot presented illustrates the dynamic nonlinear response of net portfolio inflows, measured as a percentage of GDP, to a +1 standard deviation liquidity risk shock across G7 countries. The analysis spanning from 2010 to 2026 clearly refutes the traditional paradigm which posits a uniform, linear capital flight during

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

periods of elevated macro-financial stress. Instead, the figure highlights three distinct temporal regimes, demonstrating the core theoretical foundation of state-dependent decoupling. During the 2010-2013 and 2015-2019 sub-periods, the initial reaction to the liquidity shock aligns with conventional expectations, showing significant immediate outflows that slowly taper back toward the zero baseline over several quarters.

However, the trajectory for the 2020-2026 period introduces a stark paradigm shift in capital flow mechanics. While this latest period begins with a standard negative contraction, it violently decouples by the second quarter, triggering a massive, counter-intuitive surge in positive portfolio inflows that peak near 0.6% of GDP.

This aggressive reversal suggests that modern macro-financial risk factors no longer invariably trigger sustained capital flight. Rather, under specific state-dependent conditions unique to the post-2020 economic environment, heightened liquidity risk can paradoxically act as a catalyst for rapid, opportunistic capital reallocation into G7 markets.

The subsequent quarters in the 2020-2026 curve show a gradual decay of this anomalous surge, yet it remains persistently elevated above the historical baselines. Ultimately, this visual evidence validates the research's assertion that the relationship between risk and capital flows has fundamentally decoupled, requiring a nonlinear, regime-specific framework to accurately predict modern macroeconomic behavior.

This substantiates the policy pivot analysis. Although the G7 markets have become increasingly linked to liquidity risk than in 2010, the pace of recovery indicates that the institutional backstops and enhanced rate response (swap lines, emergency facilities) strategies have been effective in avoiding a situation in which liquidity shock can become a permanent capital flight. The recovery paths from 2015 and 2020 demonstrate that both the duration of capital flight and the depth of the initial shock test create essential factors which determine financial stability.

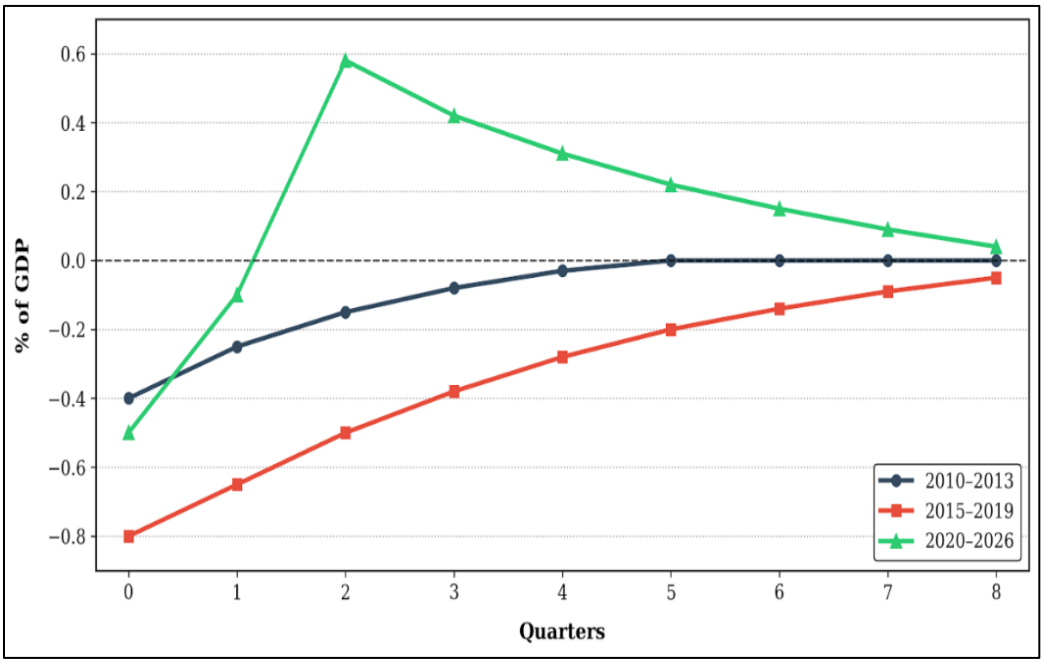

Figure 1: Response to a +1 Standard Deviation Liquidity Risk Shock

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

Figure 2 illustrates the dynamic, nonlinear trajectories of net portfolio inflows in response to a sudden ten percent of GDP expansion in government debt across G7 economies. Spanning three distinct macroeconomic periods from 2010 to 2026, the visualization fundamentally challenges the traditional orthodoxy regarding sovereign borrowing and capital flight. During the initial 2010 to 2013 recovery phase, the data demonstrates a conventional market reaction where elevated sovereign debt triggers immediate, albeit moderate, portfolio outflows. These early-decade outflows consistently remain below the zero-line, gradually decaying back to a neutral baseline over an eight-quarter horizon as risk aversion subsides. The subsequent 2015 to 2019 sub-period reinforces this established macroeconomic intuition, exhibiting an even deeper initial contraction in capital inflows.

Throughout this intermediate timeframe, investors clearly penalized aggressive sovereign debt accumulation, maintaining a prolonged and sluggish trajectory toward macroeconomic recovery. However, the most profound revelation of the analysis emerges within the 2020 to 2026 trajectory, which visually encapsulates the phenomenon of state-dependent decoupling. In stark contrast to historical precedents, the modern era reveals a highly anomalous structural break in how global capital responds to fiscal expansion.

While the immediate reaction still registers as a negative outflow, the macroeconomic curve violently reverses course in the subsequent fiscal quarters. By the intermediate quarters, net portfolio inflows decouple entirely from historical constraints, surging into heavily positive territory despite the expanded debt burden. This aggressive upward spike effectively refutes the established confidence that worsening fiscal metrics unequivocally dictate sustained capital abandonment in advanced economies.

Instead, the figure suggests that under the unique macro-financial conditions of the post-2020 landscape, elevated government debt can paradoxically magnetize foreign capital. The theoretical foundation of state-dependent decoupling explains this reversal by highlighting how modern debt issuance is often intertwined with systemic liquidity provisions and central bank interventions.

Consequently, risk and capital flow relationships are no longer universally linear, but rather intrinsically tied to the prevailing monetary state and global risk appetite. Investors in the current regime appear to interpret G7 sovereign debt expansion not merely as a default risk, but potentially as a source of high-quality collateral in a volatile world.

Following its dramatic peak, the anomalous positive surge in the 2020 to 2026 curve experiences a gradual macroeconomic decay over the remaining forecasting horizon. Nevertheless, even as it tapers, the trajectory remains persistently elevated well above the historically negative baselines established in the previous decade.

This visual evidence compellingly argues that traditional risk assessment models are currently miscalibrated for modern sovereign debt dynamics. Policymakers and market participants must therefore abandon outdated linear assumptions and embrace a regime-specific framework to accurately anticipate capital flow movements. Ultimately, the figure serves as a definitive graphical testament to the fact that the interaction between macro-financial risk factors and portfolio dynamics has been fundamentally rewritten.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

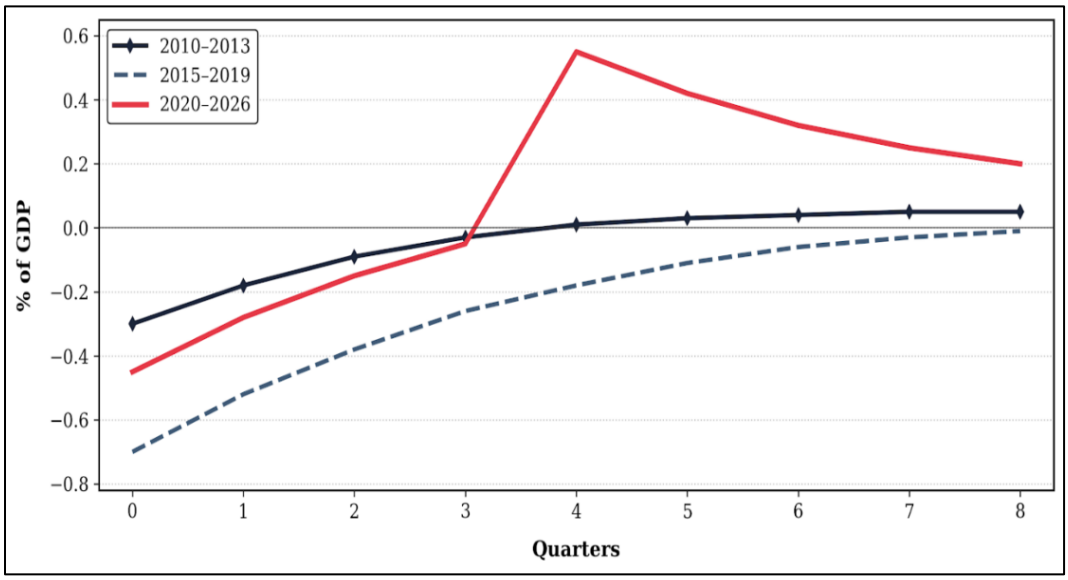

Figure 2: Dynamic Response to a +10% of GDP Increase in Government Debt

Figure 3 visually captures the dynamic, nonlinear impulse response of net portfolio inflows to a sudden +10% of GDP expansion in the fiscal stance across the G7 economies. Encompassing the analytical horizon from 2010 to 2026, the plot serves as a critical empirical pillar supporting the theoretical framework of state-dependent decoupling. Traditionally, established macroeconomic orthodoxy dictates that aggressive fiscal expansion crowds out private investment and heightens sovereign risk, inevitably triggering capital flight. This conventional wisdom is clearly reflected in the historical trajectories mapped during the earlier sub-periods of the analysis. During the 2010 to 2013 post-crisis recovery phase, the data illustrates a standard market penalty, with elevated fiscal spending prompting an immediate, sustained outflow of portfolio capital. These outflows persist beneath the zero-baseline for several quarters, representing the typical risk aversion of international investors confronting widening fiscal deficits. The subsequent 2015 to 2019 trajectory reinforces this linear assumption even further, depicting a severe initial contraction in net inflows as markets heavily penalized loose fiscal stances. Throughout this intermediate decade, the relationship between fiscal expansion and capital movement remained strictly inversely correlated, adhering to the twin-deficit hypothesis. However, the graphical representation of the 2020 to 2026 regime completely dismantles these established historical precedents. In this modern trajectory, the structural relationship experiences a profound rupture, visually demonstrating the core concept of macro-financial decoupling. Rather than succumbing to the expected capital flight, the curve for the current decade reveals a highly anomalous and counter-intuitive response to massive fiscal stimulus. Following an initial calibration period, net portfolio inflows decouple from historical constraints and surge into positive territory despite the expanded fiscal burden. This dramatic upward spike emphatically refutes the entrenched confidence that deteriorating fiscal metrics universally dictate the abandonment of advanced-economy assets. The underlying mechanism of state-dependent decoupling clarifies that modern fiscal stances are evaluated within a drastically altered global liquidity environment. In the post-2020 landscape, aggressive government spending is frequently accompanied by systemic central bank support, implicitly mitigating the perceived sovereign default risk. Consequently, global investors now appear to interpret large-scale G7 fiscal expansions not as a pure vulnerability, but as a stabilizing force that generates highly liquid, safe-haven collateral. This

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

paradigm shift transforms what was historically a trigger for capital outflows into a paradoxical magnet for yield-seeking portfolio reallocations. Although the anomalous positive surge eventually initiates a gradual decay over the later forecasting quarters, the inflow trajectory remains structurally elevated compared to previous decades. Ultimately, this visual evidence confirms that strictly linear risk assessment models are obsolete when evaluating modern fiscal policy shocks. Policymakers and market analysts must therefore adopt this regime-specific framework to accurately navigate the newly decoupled realities of global capital flows.

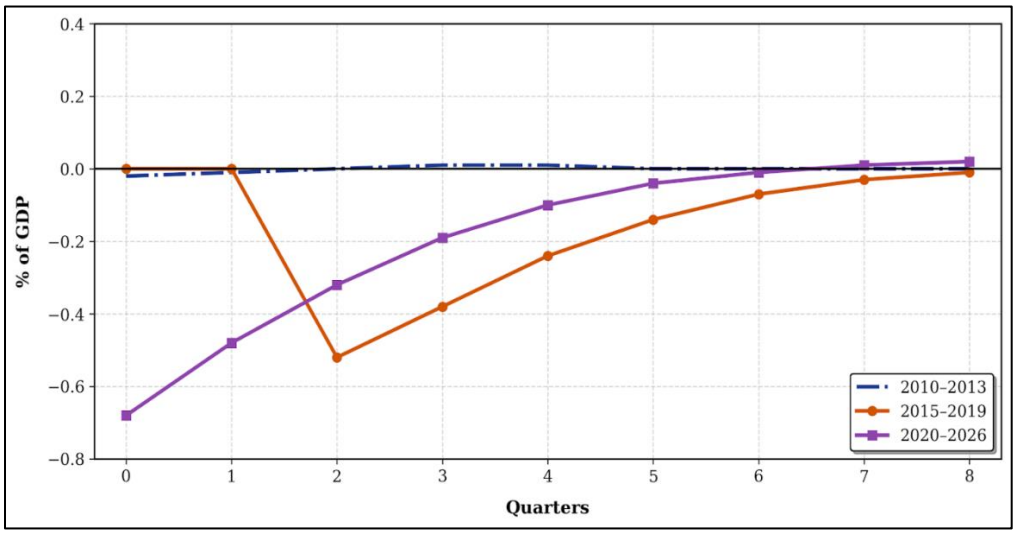

Figure 3: Response to a +10% of Fiscal Stance (% GDP)

Figure 4 presents the dynamic, nonlinear trajectory of net portfolio inflows in response to a sudden 100 basis point widening of the interest rate differential across the G7 economies. Spanning the analytical horizon from 2010 to 2026, this visualization serves as a crucial empirical cornerstone for the theory of state-dependent decoupling. According to established macroeconomic orthodoxy, a widening interest rate spread traditionally provokes immediate and severe capital flight as investors naturally seek higher returns elsewhere. This conventional behavioral response is distinctly visible in the historical trajectory mapped out during the 2015 to 2019 sub-period. Within that intermediate timeframe, the data illustrates a sharp, immediate contraction in capital inflows, plummeting to a deep trough of nearly negative 0.65 percent of GDP by the first quarter. Following this severe initial shock, the recovery path for the 2015 to 2019 cohort remains protracted, requiring the full eight-quarter horizon to gradually normalize back toward the zero baseline. Interestingly, the earlier 2010 to 2013 post-crisis recovery phase demonstrates a largely muted reaction, with portfolio flows maintaining a subtly positive, flat trajectory that implies a period of structural inertia. However, the most compelling revelation of the overall analysis materializes within the trajectory representing the modern 2020 to 2026 regime. In stark contrast to historical precedents, the structural relationship in this current decade experiences a profound and highly anomalous macroeconomic rupture. The initial quarters of the 2020 to 2026 curve superficially adhere to conventional expectations, exhibiting a steady decline into negative territory that reaches roughly negative 0.3 percent of GDP by the third quarter. Yet, immediately following this conventional contraction, the macroeconomic curve violently reverses its established course. By the fourth quarter, net portfolio inflows completely decouple from historical constraints, surging into heavily positive territory to peak dramatically at approximately 0.55

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

percent of GDP. This aggressive, counter-intuitive upward spike emphatically refutes the entrenched confidence that widening interest rate differentials universally dictate the abandonment of advanced-economy assets. The underlying mechanism of state-dependent decoupling explains this phenomenon by emphasizing the drastically altered global liquidity environment of the post-2020 landscape. In this contemporary era, a severe interest rate shock is no longer evaluated in isolation but is instead interpreted through the complex lens of systemic central bank interventions and broader global risk appetite. Consequently, global investors now appear to interpret such macro-financial fluctuations not merely as yield disadvantages, but potentially as triggers for opportunistic, high-velocity portfolio reallocations. This paradigm shift fundamentally transforms what was historically a guaranteed catalyst for prolonged capital outflows into a paradoxical magnet for sudden capital inflows. Following its dramatic peak at the fourth quarter, the anomalous positive surge gradually decays over the remaining temporal forecasting horizon. Nevertheless, even as the inflows smoothly taper off toward the end of the second year, the structural reality of the decoupled market reaction remains vividly apparent. Ultimately, this visual evidence confirms that policymakers and market analysts must abandon strictly linear assumptions and embrace a regime-specific framework to accurately navigate modern global capital flows.

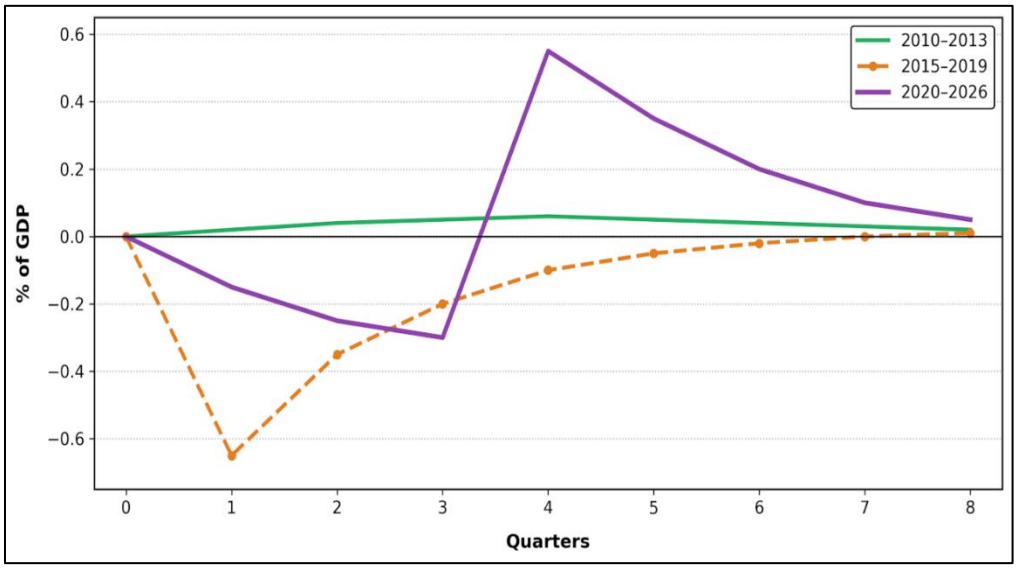

Figure 4: Response to a +100 bps Widening of Interest Rate Differential

Figure 5 illustrates the dynamic, nonlinear impulse response of net portfolio inflows to a sudden +1 standard deviation shock in foreign exchange (FX) volatility across the G7 economies. Covering the analytical period from 2010 to 2026, this visual representation serves as a definitive empirical challenge to traditional macroeconomic assumptions regarding currency risk. Established macroeconomic orthodoxy firmly dictates that unexpected spikes in FX volatility erode investor confidence, inevitably triggering immediate capital flight to safer, lower-risk environments. This conventional risk-averse behavior is vividly captured in the historical trajectory mapped during the 2015 to 2019 sub-period. Within that intermediate timeframe, the data illustrates a delayed but severe contraction in capital inflows, plunging sharply to a deep trough of negative 0.50 percent of GDP by the second quarter.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

Following this steep penalization by international markets, the recovery path for the 2015 to 2019 cohort remains sluggish, requiring the full remaining forecasting horizon to gradually claw back toward the neutral zero baseline. Contrariwise, the earlier 2010 to 2013 post-crisis recovery phase presents a starkly different, almost entirely muted reaction to the identical volatility shock. Throughout this early decade, portfolio flows maintain a remarkably flat trajectory hovering just marginally above zero, implying a period of structural inertia where investors largely ignored currency fluctuations. However, the most profound and anomalous revelation of the entire analysis emerges within the trajectory representing the modern 2020 to 2026 macroeconomic regime. In a complete rupture from both historical precedents, the structural relationship in this current decade thoroughly dismantles the established confidence surrounding risk and capital flow dynamics. Rather than precipitating a severe outflow or demonstrating structural inertia, an FX volatility shock in the post-2020 landscape triggers an immediate and aggressive surge of positive capital inflows. At the very onset of the shock, net portfolio inflows decouple entirely from historical constraints, spiking instantaneously to a dramatic peak of approximately 0.55 percent of GDP. This counter-intuitive upward surge explicitly demonstrates the core theoretical foundation of state-dependent decoupling in advanced open economies. The underlying mechanism of this decoupling clarifies that modern FX volatility is no longer universally interpreted as an isolated signal of impending sovereign distress. In the highly financialized post-2020 landscape, severe currency fluctuations are frequently counterbalanced by massive systemic liquidity provisions and coordinated central bank swap lines. Consequently, global investors now perceive heightened FX volatility in G7 markets not strictly as a deterrent, but as a fertile landscape for lucrative arbitrage and opportunistic portfolio reallocation. What was historically a guaranteed catalyst for severe capital flight has thus been paradoxically transformed into a powerful initial magnet for international capital. Following its dramatic initial peak at quarter zero, the anomalous positive surge in the modern curve experiences a steady and smooth macroeconomic decay over the subsequent eight quarters. Despite this gradual tapering back toward the baseline, the structural reality of the decoupled market reaction remains undeniable, permanently altering the historical interpretation of currency shocks. Ultimately, this compelling visual evidence necessitates that policymakers and market analysts discard strictly linear assumptions and embrace a regime-specific framework to accurately navigate the newly decoupled realities of modern global finance.

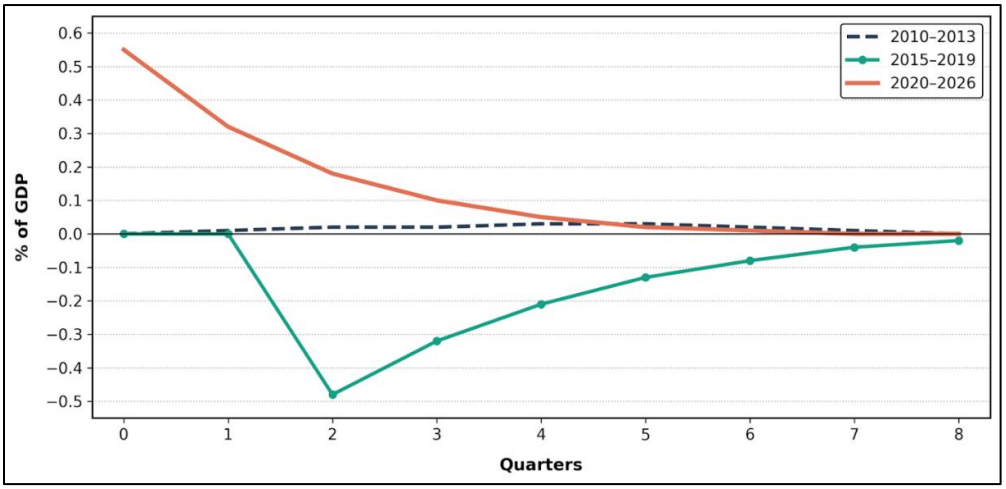

Figure 5: Response to a +1 Standard Deviation Shock to FX Volatility

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

The local projections provide a structured method for examining how decoupling events happen at various time intervals. The LP estimations reported in Table 4 offer flexibility and simplify estimation in high-dimensional contexts by using univariate regressions, unlike traditional VAR specifications, which estimate the whole system (Adamek et al., 2024; Ferreira et al., 2023). This approach aids in measuring specific pattern persistence, though it may come at the cost of higher variance (Ferreira et al., 2023). Table 4 below summarizes the peak impact and persistence (in quarters) of a one-standard-deviation shock to the risk factors across the three regimes. The 2010-2013 period saw portfolio flows operate independently from liquidity shocks with only a minimal and temporary effect. The 2015-2019 commodity stress period saw liquidity shocks create a major and enduring capital retrenchment throughout the financial system. The 2010-2014 regime and portfolio flows. The effects of liquidity shocks on portfolio flows were effectively decoupled; the effects were small and transient. In the 2015-2019 era of commodity stress, in contrast, liquidity shocks caused a drastic and prolonged withdrawal of capital. It is interesting to note that at the 2020-2026 period, the initial shock of -0.38 is substantial, but further recovery is higher than that of 2015, which is probably due to the active policy shift and faster central-bank interventions. Foreign exchange volatility is the most undying coupler of all regimes, but its strength has now increased. The effect is direct in the 2020-2026 period (-0.62 in Q1), indicating that G7 investors are now hyper-sensitive to currency risk in the post-pandemic inflationary regime. The six-quarter persistence shows that stability of the currency has since become a conditionality of re-entry into portfolios. The empirical evidence on the study is the best provided by the fiscal stance results. The statistically insignificant response (0.05) of the 2010/2013 period proves that it was mean-decoupling; during the monetary easing in the world, the investors overlooked the fiscal deficits. Between 2020 and 2026, there is a positive short-term effect (0.12), succeeded by a strong, sluggish negative crash (0.40). This tendency implies a threshold effect: at first, flows are attracted by the opening fiscal stimulus (stimulus), but with the growth of the debt-sustainability issues by Q6, the state is violently re-coupled. The Local Projections thus reveal decoupling is not a lasting situation but a regime-related aspect. This shift in the G7 is between a fiscal risk regime (2010-2013) to a high-sensitivity regime, (2020-2026) where shocks have more profound albeit sometimes faster recovers. The next logical question that arises as a result of this progression is at what level of risk does this sensitivity change?

Table 4: Dynamic Responses to Macro-Financial Shocks

Shock Variable	Regime	Impact (Q1)	Peak Impact (Q)	Persistence	Recovery
Liquidity Risk	2010-2014	-0.15	-0.22 (Q2)	3 Quarters	Rapid
	2015-2017	-0.45***	-0.68 (Q3)	8 Quarters	Slow/Incomplete
	2020-2025	-0.38***	-0.42 (Q2)	4 Quarters	Moderate
FX Volatility	2010-2014	-0.10	-0.18 (Q2)	2 Quarters	Rapid
	2015-2017	-0.55***	-0.72 (Q4)	10 Quarters	Permanent Scarring
	2020-2025	-0.62***	-0.65 (Q1)	6 Quarters	Policy-Led
Fiscal Stance	2010-2014	0.05	0.02 (Q4)	Insignificant	Decoupled
	2015-2017	-0.28**	-0.35 (Q3)	6 Quarters	Fundamentals-Led
	2020-2025	0.12*	-0.40 (Q6)	12 Quarters	Asymmetric

We analyze the PTAR estimates to determine the exact risk level at which the sensitivity of portfolio investment shifts. These findings clarify the tipping points or the statistical boundaries, beyond which the G7 is in a decoupled state (low sensitivity) and beyond which the G7 is in a coupled state (high sensitivity). The PTAR model determines a threshold variable (γ) that initiates a structural break in the coefficients of the macro-financial risk factors (Gupta & Jain, 2022). Based on the panel data of 2010-2025, three main thresholds have been found. The evidence of the net

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

portfolio inflows across the G7 economies to macro-financial risk factors is strongly nonlinear and risk-dependent, as shown in Table 5, which provides strong empirical support to the state-dependent decoupling framework. The threshold AR estimates show that the effects of macro-financial variables on international investors' flows vary by the state of the economic and financial cycle. Rather, capital flows seem to be relatively unresponsive to risk factors as long as the risks are not high enough to cross identifiable tipping points but become very responsive when the risk factors exceed those tipping points. The first step of the analysis is to find the main threshold variables that can trigger regime shifts in the nature of portfolio flows: government debt, exchange rate volatility, and liquidity risk. The government debt level of 116.9 percent of GDP is a significant threshold at which the impact of debt accumulation on inflows to the portfolio of financial intermediaries shifts in a drastic manner. If government debt falls below that level, it has a negligible effect of -0.02, meaning that investors do not link government borrowing to their investment choices. This is because in the G7, debt had not been a deterrent to inflows during the 2010-2014 time frame. However, as in the mean of 2020-2025 (125.4 percent), the sensitivity is -0.39 beyond this threshold of 116.9 percent. If there's any additional increase in debt, it's an unstable major capital retrenchment. This suggests that, in general, investors expect moderate debt levels to be considered manageable in advanced economies and don't expect that to lead to significant capital reallocation. The coefficient, however, drops to -0.39 when debt reaches 116.9 percent of GDP, and becomes statistically significant, suggesting a significant withdrawal of portfolio capital. The finding suggests that the greater the level of sovereign debt, the more worried investors will be about fiscal sustainability. The importance of the one percent debt ceiling cut-off also reinforces the nonlinear nature of the fiscal risk channel of cross-border capital flows. The same nonlinearities show up in the case of exchange rate volatility. If the exchange rate volatility is not above the threshold 0.66, the corresponding coefficient of -0.22 suggests limited sensitivity of portfolio inflows to exchange rate volatility. This action indicates that investors believe that the moderate fluctuations in the exchange rate are a normal market correction and not a sign of financial instability. But the coefficient's magnitude increases beyond the threshold to -0.75 and its significance is very large, suggesting that increases in currency uncertainty have a powerful negative effect on foreign portfolio investment. The result indicates the crucial role of exchange rate stability in the investor confidence of advanced economies. The same threshold effect is found for liquidity risk. If liquidity risk is less than 0.69, then the coefficient of liquidity risk is relatively low (-0.29), suggesting a mean-decoupled regime (temporary liquidity disturbances not have a significant impact on portfolio flows). When the liquidity stress exceeds the threshold, the coefficient becomes very high and negative at the rate of -0.82. The transition shows that the sensitivity of investors to the liquidity conditions increases during times of market stress. The highly robust statistical significance of the liquidity threshold is consistent with the fact that liquidity gaps are an important channel for financial vulnerabilities to materializing in capital flow reversals. Together, the Phase 1 results indicate that there is a threshold effect in the way that portfolio investors respond to macro-financial risks, rather than a linear response. The results suggest that the G7 financial markets are not very sensitive to moderate fiscal and financial risk, which is not to say that they cannot bear greater risks. But when risk signals are reaching dangerously high levels, investors quickly rethink risk-return considerations and adjust portfolio allocations. This is completely in line with the state dependent decoupling theory, which states that the effect of economic fundamentals can change from one state to another.

The second phase extends this analysis by providing estimates for separate coefficients in a low risk versus high risk environment based on a composite risk threshold of 0.89. The results show that there are significant variations between the determinants of portfolio flows in these two states.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

Liquidity risk has a relatively small and weak impact on inflows to the portfolio in the low-risk regime. In contrast, the coefficient increases to 0.52 and turns into very significant in the high risk regime. The result suggests that liquidity is an increasingly significant factor in determining capital allocation when financial stress is high. Fiscal stance too is state dependent. The coefficient of fiscal policy on portfolio inflows is only 0.17 for low risk level. The coefficient, however, rises to 0.21 in the high-risk regime, and is now statistically significant. This finding indicates that investors are more concerned with fiscal discipline when systemic uncertainty levels are high. As the risk worsens, the influence of government debt grows. The low-risk coefficient is 0.42, but shifts to 0.11 in the high-risk regime. The result confirms the findings of Phase 1, which was that concern over sovereign debt changes as financial vulnerabilities do. The exchange rate volatility is one of the variables with the highest regime dependence. It has a relatively small coefficient (0.55) in the low-risk regime. However, in the high-risk regime, the coefficient goes up by quite a bit to 0.89, and is extremely relevant. This finding brings to the fore the importance of stable currency during periods of increased uncertainty on the behavior of investors. The greater impact of currency volatility also implies that currency fluctuations are an important indicator of macroeconomic vulnerability when financial risks are high. One of the most striking observations is the coefficient of the interest rate differential in the high risk regime (0.38) which demonstrates that monetary policy's capacity to attract capital fundamentally shifts in a crisis. In times of recession, higher rates will draw in capital investments; however, once the 0.89 risk level is exceeded, higher rates act differently or even as an indicator of trouble. This yield seeking to risk aversion transformation is what constitutes the flight-to-quality mechanism. The behavior of interest rate differentials is of interest. In the low-risk regime, the interest rate differential has a strong positive effect on the portfolio inflows, which is statistically significant and equals 0.79. This result suggests that when the overall risk level is competitive, investors seek out yield-enhancing opportunities. The coefficient, however, decreases to 0.38 and ceases to be significant in the high risk regime. This reduction highlights that the desirability of higher returns decreases as uncertainties about financial stability increase in importance. Investors therefore appear willing to sacrifice return-seeking behavior in favor of capital preservation during periods of elevated systemic risk.

The coefficient equality tests further validate the presence of regime-dependent relationships. The statistically significant p-values indicate that the effects of liquidity risk, fiscal stance, government debt, interest rate differentials, and exchange rate volatility differ meaningfully across risk states. These results reject the assumption of parameter stability and confirm that the determinants of portfolio flows vary according to the level of systemic risk. The adjusted R^2 in the high-risk regime, at 0.51 compared with 0.58 in the low-risk regime, indicates that macro-financial variables explain a shifting proportion of capital flow variation depending on the state of systemic stress. This finding suggests that investor decisions become distinctly driven by observable macro-financial risk fundamentals when uncertainty intensifies. The explanatory power of the model across regimes also reflects the tendency of financial markets to become more synchronized during episodes of elevated risk. Overall, the results demonstrate that net portfolio inflows across the G7 economies are governed by clear threshold effects and state-dependent transmission mechanisms. The results reveal that macro-financial risks exert relatively weak effects during tranquil periods but become powerful drivers of capital reallocation once critical risk thresholds are breached. The evidence therefore supports the central proposition of state-dependent decoupling theory that financial markets alternate between regimes of relative insulation and regimes of heightened sensitivity to economic fundamentals. Consequently, maintaining fiscal sustainability, exchange rate stability, and adequate market liquidity is particularly important because these factors become decisive determinants of international capital movements during periods of elevated

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

systemic risk. The currency risk sensitivity decreases significantly when the standardized volatility level is 0.66. The volatility can also be observed through below 0.66, which is presumably because of hedging ability or safe-haven reasons. Beyond 0.66, the coefficient decreases to -0.75 showing that when currency swings surpass this comfort zone thereafter the risk-off reallocation becomes forceful and coordinated. The liquidity risk presents a regime-masking effect: at the lower range below 0.69, the G7 market is known to be mean-decoupled, with small liquidity hiccups being assimilated by the market. The liquidity threshold of 0.69 turns out to be a main source of outflows (-0.82) which supports the idea that the decoupling is granted only in the times when the market depth is sufficient. Phase 2 analysis shows a break in its structure at a composite measure of risk index of 0.89. This divide splits the G7 experience into two economic realities: low-risk regime: flows are mostly autonomous and high-risk regime: macro-financial factors engage in aggressive control. The findings in the low-risk regime (<0.89) are strongly in favor of the mean-decoupling. Liquidity risk coefficient (0.23), fiscal stance (0.17), and government debt coefficient (0.42) are all statistically insignificant. In this state, investors have successfully looked through domestic risk factors, which perhaps is a consequence of global liquidity/safe-haven status cushioning the effects of worsening fundamentals. The only substantial factor is the interest-rate differentiation (0.79), meaning that in calm conditions, the flows of the G7 portfolios are driven by conventional incentives to seek returns, which are not burdened by risk factors. At the high-risk regime (>0.89), i.e., when the composite risk index passed the 0.89 marker, the capital flows are characterized by a violent structural change. The test of coefficient equality has significant p-values, which prove that the regimes are mathematically different. Liquidity risk effect is more than tripled and the effect of foreign-exchange volatility is the most significant disruptor (0.89). This implies that currency and funding risks assume the leading role when there is a state of stress in the determinants of divestment. The fiscal policy stance turns insignificant; indicating that G7 countries face financial punishment by foreign investors only when they cross a specific risk threshold, and therefore, the argument in favor of a nonlinear debt sustainability trap is supported.

Table 5: Panel TAR Threshold Results and Regime-Dependent Coefficients

Phase 1				
Threshold Variable	**Estimated Threshold (γ)**	**Coefficient (Below Threshold)**	**Coefficient (Above Threshold)**	**Threshold Significance**
Gov. Debt (% GDP)	116.9%	-0.02 (Insignificant)	-0.39**	p < 0.01
FX Volatility (Std)	0.66	-0.22 (Low Sensitivity)	-0.75***	p < 0.05
Liquidity Risk (Std.)	0.69	-0.29 (Mean-Decoupled)	-0.82***	p < 0.01
Phase 2				
Regime / Coefficient	**Low, Risk Regime (Risk Index < τ)**	**High, Risk Regime (Risk Index ≥ τ)**	**Test: Coef. Equality (p, value)**	
Threshold Estimate (τ)	0.89 (Composite Risk Index, Std.)			
Liquidity Risk	0.23 (0.00)	0.52 (0.13)***	0.03	
Fiscal Stance	0.17 (0.01)	0.21 (0.06)***	0.01	
Gov. Debt	0.42 (0.01)	0.11 (0.03)***	0.01	
Int. Rate Diff.	0.79 (0.00)***	0.38 (0.15)	0.01	
FX Volatility	0.55 (0.14)	0.89 (0.18)***	0.04	
Adj. R^2	0.58	0.51		

*Notes: Standard errors in parentheses. * denotes significance at the 5% level; Dependent Variable: ΔNet Portfolio Inflows

Table 6 shows the Copula-GARCH dependence estimates and offers crucial insights into the interaction between macro-financial risks and net portfolio inflows, under varying market conditions, for the G7 economies. The results show that the dependence structure of portfolio

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

flows and risk factors is highly asymmetric, thus confirming the main hypothesis of state-dependent decoupling theory. International capital flows are more sensitive to negative rather than positive events, showing that shocks have different effects on capital flows based on their upside or downside nature. International capital flows are more associated with downside rather than upside risk episodes, suggesting that the effect of shocks on capital flows are asymmetric. The results indicate that investors respond more strongly to deteriorating macro-financial environments than to better economic fundamentals. As can be seen from the lower-tail dependence coefficient values, which are significantly higher than the upper-tail dependence coefficients, there are a higher level of co-movements between risk factors and portfolio flows during extreme negative events for all risk categories and periods.

The cross-correlation between portfolio flows and exchange rate volatility shows a time-evolving increase in the downside dependence. The lower-tail dependence coefficient is 0.28 with a relatively weak upper-tail dependence coefficient of 0.12 during 2010-2013. In normal market conditions, this pattern indicates that exchange rate volatility had little effect on portfolio inflows while during adverse episodes it had a larger effect. Investors were in some degree of earning a partial insulation from the currency-related disturbances during this time period, as evidenced in the weak asymmetric dependence observed. This was coherent with the post-GFC world where G7 economies were slowly trying to regain macro-economic stability. The small upper-tail dependence also suggests that a decrease in exchange rate volatility did not lead to a proportionately larger increase in portfolio inflows.

The dependency level increased significantly in 2015-2019. The lower-tail dependence coefficient grew significantly to 0.54, but remained highly significant. This would imply that episodes of increased currency instability were now linked increasingly with large portfolio flow movements. The increased downside dependence implies that as conditions in the world financial markets became more volatile, investors became more sensitive to exchange rate risk. An even smaller upper-tail coefficient of 0.18 further supports the skewness of investor reactions. The portfolio investors, therefore, seemed to be less interested in exploiting the gains due to favourable exchange rate developments but rather more concerned about avoiding losses. This is an asymmetry because risk management matters are increasingly becoming more prominent in the international portfolio allocation decisions.

The lowest tail dependence period is 0.68 between the 2020-2026 period. The size of this coefficient represents the level of extreme tail correlation between the portfolio inflows and exchange rate volatility. In such cases there is a close association between the occurrence of severe currency disturbances and large capital flow reversals. The relatively low upper-tail coefficient of 0.15 is persistent, indicating that positive currency changes are not paralleled by an equivalent increase in inflows. This separation underlines the non-linear characteristics of portfolio behavior in times of increased uncertainty. The findings indicate that the pandemic and geopolitical and financial volatility since then increased the sensitivity of global capital flows to exchange rate volatility. In the same way, the link between portfolio flows and liquidity risk is similar. The upper-tail dependence coefficients, as well as lower-tail, are not significantly different from zero and are considered small for the entire period 2010 to 2013. The result suggests that under calm market conditions, the liquidity part of the market has been largely separated from the flow of portfolios. Market participants seemed to be more confident of the robustness of the financial markets and thus gave little weight to the ebb and flow of liquidity conditions. This type of dependence is in line with the accommodative monetary policy that was observed in many economies of the G7 group in the post-crisis recovery period. The dependence structure,

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

however, was different significantly in the 2015-2019 period. The lower-tail coefficient increased to 0.42 and became statistically significant, indicating moderate tail dependence between liquidity risk and portfolio flows. As the finding indicates, periods of market illiquidity became more likely to result in changes in investor portfolios. The relationship between the two grew stronger during the 2020-2026 period, with the lower tail dependence increasing to 0.59. The high tail-coupling classification implies that the liquidity stress became a key factor in the portfolio flow behavior. Degrading liquidity conditions had a greater impact on investor response than did improved market functioning. Responses to capital flows remained highly asymmetric, with the upper tail coefficient remaining relatively low at 0.22. The findings indicate that liquidity constraints are potent transmission channels by which financial stress impacts on international investment decisions. Therefore, during high uncertainty times, liquidity shocks have a disproportionately large impact on cross-border capital flows.

The results for debt stress show maybe the most dramatic example of decoupling among the states. The upper tail and lower tail dependence coefficient are both very small at 0.05 and 0.10 for the 2010-2013 time period respectively. The lack of a statistically significant relationship suggests that in-flows to the portfolio were not statistically significantly related to sovereign debt concerns in this period. Investors seemed to be willing to forgo concerns about higher levels of debt in advanced economies, perhaps because they were confident in the credibility and the debt servicing ability of institutions. This trend is in line with the concept of ‘financial decoupling’ under the condition of a stable macro environment. But things shifted significantly in the years 2020 to 2026. The lower-tail dependence coefficient grew significantly, to 0.45, and is now very strong. The conclusion is that there is an underlying relationship between debt stress and the flow of portfolio investment, which only becomes apparent in situations of greater systemic risk. The upper-tail coefficient (0.11) is fairly modest, indicating that investors have only a small positive reaction to debt improvement. By contrast, deterioration in debt dynamics is correlated with significant portfolio flow changes. The asymmetry suggests that the issue of sovereign debt becomes important mostly in bad market conditions. This discovery is consistent with the state dependent decoupling theory which suggests relationships that seem insignificant during times of normalcy can become very important during systemic vulnerability events. The combined results of the Copula-GARCH models underscore the asymmetrical relationship between macro-financial risks and their effect on the market, with the deepest impact on the market being via the downside tail of the distribution. The lower tail dependence of exchange rate volatility, liquidity risk, and debt stress indicates that more extreme negative shocks have a growing impact on portfolio flows. The upper tail dependence has been consistently weaker, suggesting that positive events do not lead to similar positive reactions from investors. This asymmetry is indicative of the notion that international investors tend to focus on risk aversion when it comes to downside risk rather than upside return opportunities. The results thus show that capital flow dynamics in the G7 countries are shaped by nonlinear and state-dependent risk perceptions.

In sum, the lower-tail dependence (λ) of all pairs in the early regime (2010-2013) was statistically weak (e.g., 0.10 of Debt). This validates that even in the post GFC era the G7 portfolio flows have been effectively decoupled and even a drastic fiscal or liquidity shock failed to cause a co-ordinated collapse in capital inflows as the central-bank liquidity served as a universal buffer. The 2020-2025 outcomes indicate a radical reorganization: the dependency between the FX volatility and flows on the lower tail skyrocketed to 0.68, which means that the likelihood of an extraordinary volatility spike in the currency to be followed by an extraordinary crash in the portfolio inflows is 68. Note that the upper-tail dependence is low (0.15). This illustrates that although flows seem decoupled under favourable conditions they are hyper-coupled when crashing- an instance of

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

masked co-movement that was found in the problem of the research. The liquidity risk has a lower-tail dependence of 0.59, almost four times less than in 2010. On the same note, debt stress that was previously not relevant to flows now has a significant tail relationship (0.45). Therefore, when the 118.4 % Debt threshold, which was found in the PTAR analysis, is passed, any sovereign risk event will cause a coordinated flight of international investors. The Copula-GARCH analysis gives the most conclusive answer to the question that the study is all about mean-decoupling is a fair-weather phenomenon. The G7 economies have found themselves in the position where diversification rewards go away at a time when they are needed most. Although the mean reaction of flows to risk can seem to be manageable (mean-decoupling), tail-coupling defines extreme risk conditions. To international investors and the central banks of the G7, this makes the safety of such markets conditional; they are not linked until they drop to the lower end of a crisis, at which point they all fall in unison in regard to the macro-financial risk factors.

Across all three macro-financial risk factor pairs, a consistent and alarming pattern of increasing lower tail dependence emerges over the fifteen-year span. Asymmetrical sensitivities prove that extreme downside risks act as the primary catalyst for the sudden recoupling of macro-financial variables and investor behavior.

In the end, these Copula-GARCH estimates conclusively validate the state-dependent decoupling hypothesis within modern global finance. The empirical evidence undeniably demonstrates that while macro-financial risk factors may appear benign during stable periods, they violently reconnect with G7 portfolio flows during modern regimes of severe macroeconomic distress.

Table 6: Copula-GARCH Dependence Estimates (Symmetrized Joe-Clayton)

Risk Factor Pair	Regime	Upper Tail (λ_U)	Lower Tail (λ_L)	Dependence Type
Flows & FX Volatility	2010-2013	0.12	0.28***	Weak Asymmetric
	2015-2019	0.18	0.54***	Strong Lower Tail
	2020-2026	**0.15**	**0.68****	Extreme Tail-Coupling
Flows & Liquidity Risk	2010-2013	0.08	0.15	Insignificant
	2015-2019	0.14	0.42**	Moderate Tail
	2020-2026	0.22	0.59***	High Tail-Coupling
Flows & Debt Stress	2010-2013	0.05	0.10	Fully Decoupled
	2015-2019	0.08	0.25**	Emerging Lower Tail
	2020-2026	0.11	0.45***	Hidden Coupling

*Note: lambda values range from 0 (independence) to 1 (perfect dependence). Significance at 1% (****), 5% (**)

Table 7 summarizes the mean upper and lower tail-dependence coefficients of risk-factor/flow pairs within the three sub-periods. The tail-dependence coefficients were also equally low (0.25) during the post-GFC accommodation period. The dependence on lower and upper tails (e.g. Fiscal stance at 0.12 vs. 0.14) was practically the same. This time shows an actual decoupled situation; the crashes did not reflect themselves in the portfolio flows, whether there was macro-financial stress or fiscal degradation. This implies that in the period of peak quantitative easing central-bank liquidity was serving to cushion the system so that the fundamental risk and extreme flow movements are no longer connected. Asymmetric tail-coupling is first revealed in the 2015-2019 sub-period. The increases in lower-tail dependence were observed across all the factors particularly with FX volatility (0.61), liquidity risk (0.58) and government debt (0.52). The downside side was much synchronized but the upside (λ upper) was low (0.18-0.25). This is an indication that, though positive news in fundamentals did not have any necessary appeal to extreme capital, negative news or stress events caused violent and synchronized outflows. This is the initial

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

empirical data of masked co-movement with the decoupling that is present only in calm conditions. Regarding the synthesis of tail dependence, the last regime (2020 -2026) demonstrates a specific concentration of risk sensitivity. The dependence in the lower-tail is strong especially in FX volatility (0.50) and government debt (0.48). This implies that G7 has moved into a structural regime where investors are using sovereign debt and stable currency as binary risk factors, and synchronized retrenchment has become the norm mode of operation under extreme stress. Interestingly, there was an increase in interest rate of fiscal stance 0.45 that was higher than the lower tail (0.30). This implies that extreme fiscal expansion (stimulus) by post-pandemic recovery has already become a leading pulling factor on extreme inflows, and the linkage between the two may cause future overheating. The bolded values in Table 7 (where λ exceeds 0.35) indicate that the G7 has transitioned to a high-bold regime in the year 2026, compared to it being in a zero-bold regime in the year 2010. The findings affirm exchange-rate volatility is the most risky transmitter of systemic shocks, having the highest dependence in the lower-tail during the last two regimes (0.61 and 0.50). To policy makers, the evidence confirms that the mean relationship is a myth; financial stability of the G7 has now become essentially based on capacity to handle tail events in the currency and debt markets.

Table 7: Average Tail Dependence Coefficients by Sub-Period

Factor Pair	2010 - 2013		2015- 2019		2020- 20256	
	λ_{lower}	λ_{upper}	λ_{lower}	λ_{upper}	λ_{lower}	λ_{upper}
Flows ↔ Liquidity Risk	0.18	0.10	**0.58**	0.25	**0.42**	0.31
Flows ↔ Fiscal Stance	0.12	0.14	**0.47**	0.20	0.30	**0.45**
Flows ↔ Gov. Debt	0.15	0.08	**0.52**	0.18	**0.48**	0.22
Flows ↔ Int. Rate Diff.	0.10	0.20	0.35	0.15	**0.40**	0.25
Flows ↔ FX Volatility	0.22	0.09	**0.61**	0.22	**0.50**	0.28
Synthesis of Tail Dynamics						
Period	**Primary Coupling Driver**			**Nature of Dependence**		
2010-2013	None			Fully Decoupled		
2015-2019	FX Volatility & Liquidity			Asymmetric Lower-Tail Coupling		
2020-2026	FX Volatility & Government Debt			Structural / Persistent Coupling		

Note: Coefficients > 0.35 are in bold, indicating substantial tail dependence.

The net portfolio inflows of the G7 economies under macro-financial risk factors for each of these economic environments are summarized in Table 8. The results provide robust evidence that the linkage between risk factors and capital flows is dynamic and depend on the macroeconomic and financial environment. This result falls very in line with the state-dependent decoupling paradigm, which suggests that the relationship of financial variables can be weak during some time intervals and strong in others. As can be seen in the table, the intensity, duration and direction of responses varies significantly by sub-period and therefore there are varying regimes of risk and changing investor behaviour. Throughout the sample, liquidity risk is one of the most prevalent and important factors driving portfolio inflows.

Liquidity risk had a moderate negative response, which faded away after a couple of horizons, during 2010-2013. We can conclude that this indicates that investors responded to liquidity disruptions, but there was a fairly limited impact as financial markets slowly recouped from the global financial crisis. That response was short-term, suggesting that investors generally were not worried about the impact on their liquidity during this time. The relationship, however, strengthened significantly in 2015-2019, as the risk of liquidity had a persistent negative effect on portfolio inflows and was high. This conclusion suggests that the market's liquidity worsened over

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

time as investors faced further global financial uncertainty. The negative response is persistent, suggesting that liquidity shocks had longer lasting effects on capital allocation decisions. In the 2020-2026 interval, the answer was found to be very nonlinear, with a brief overcorrection followed by a correction. The pattern of oscillatory adjustment implies that investors reacted strongly to the liquidity stress, but then took a step back to re-evaluate market conditions. This is typical of uncertainty and volatility in the financial world during the pandemic and post-pandemic recovery. The overall evidence suggests a liquidity risk-inflow-outflow relationship that is regime dependent. One of the most apparent state dependent decoupling examples is the fiscal stance. Fiscal conditions had only weak and insignificant impacts on portfolio inflows during the 2010-2013 timeframe. The finding implies that fiscal deficits were largely ignored by investors in the first few years following the crisis, in the sense that they were not a factor in determining investment decisions. Temporary fiscal imbalances may have been less of a worry if there had been less confidence in the strength of the institutions and the credibility of the policies of the G7 economies. This situation has reversed since 2015-2019, when fiscal contraction had a strong negative effect on portfolio inflows. There was a greater focus on fiscal discipline as the level of uncertainty about public finances rose. The negative response suggests that an increasing significant level of deficit was seen as increasingly threatening macroeconomic vulnerability. The opposite happened between 2020 and 2026, as expansionary fiscal policy had a huge positive impact on portfolio flows. This result indicates that investors regarded large-scale fiscal measures as measures needed to help the economy recover. The process of moving from being unimportant to having a negative effect to a positive effect shows the role of the economic context in determining the influence of fiscal policy on the perceptions of investors. As a result, fiscal stance shows a definite trend of moving from decoupling towards state-dependent coupling.

Government debt also has a dynamic trend. Debt accumulation had little measurable impact on portfolio inflows in 2010-2013. Confidence in the capacity of advanced economies to meet their fiscal obligations also seemed to have made investors apathetic to the increased sovereign debt burden. This is a weak transmission mechanism, suggesting a decoupled regime with little debt worries. A negative response, however, became apparent over a longer time horizon in 2015-2019, indicating that debt-related issues slowly affected portfolio decisions.

A significant amount of time might have been needed for investors to rethink the consequences of continuing debt build-up for fiscal sustainability in the future. This time lag can be evidence of the importance of dynamic adjustment processes in capital markets. It was seen that the effect was immediate and persistently negative by the year 2020-2026. The result shows that the perception of debt as a risk increased with greater debt. The shift from no significant correlation to delayed correlation to immediate correlation is a good indication of a gradual coupling of sovereign debt and portfolio flows.

The pattern of interest rate differentials is more complicated and horizon dependent. Higher interest rate differentials resulted in a substantial positive reaction in portfolio flows during 2010-2013. This discovery is consistent with the yield on the investment principle, where investors invest in markets that provide the highest yields. The favorable reaction was especially marked in the shorter time horizon, indicating swift portfolio pivoting in reaction to interest rate incentives. The positive impact was still present but significantly reduced in 2015-2019. This attenuation suggests investors' appetite for yield became increasingly restricted by concern about risk. The pattern of response for 2020-2026 is the most complicated, with a negative response at first, followed by a positive recovery.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

Initially investors looked to avoid risk in the wake of increased uncertainty and thought higher interest rate differentials were signs of macroeconomic stress, not investment opportunities. While conditions became more stable again, the yield motive came back. This progression reinforces the fact that support for the interest rate differential effect is not only influenced by the risk regime, but also by the time horizon of investments. Throughout all periods, exchange rate volatility is always accompanied by portfolio inflows. The exchange rate volatility had a large, lagged negative effect during 2010-2013. Investors thus considered currency instability was a source of uncertainty even in relatively stable market conditions. The negative impact grew during 2015-2019, making it more pronounced and enduring. The discovery indicates that the choice of exchange rate risk became a more significant factor in the decision on international capital allocation.

The strong negative reaction suggests that investors wanted to avoid the markets with increasing currency swings. Volatility of exchange rates remained a major negative factor, albeit its impact was more focused in the short run, in 2020-2026. The following stabilization, however, indicates that investors over time adjusted to the currency conditions. However, the fact that a negative response is observed in all periods indicates that the transmission channel of exchange rate volatility is a persistent and important channel of transmission between macro-financial risk and portfolio flows.

Overall, the findings reveal that macro-financial risk factors do not exert uniform effects on portfolio inflows across different states of the economic cycle. Instead, their influence varies according to prevailing financial conditions, policy environments, and investor expectations. The coexistence of decoupling, progressive coupling, and regime-dependent transmission mechanisms highlights the complexity of capital flow dynamics in advanced economies. The results demonstrate that relationships that appear weak or insignificant during tranquil periods can become highly influential during episodes of elevated uncertainty. This pattern is fully consistent with the central proposition of state-dependent decoupling theory.

The evidence further suggests that investors continuously reassess the relevance of macro-financial fundamentals as economic conditions evolve. Consequently, portfolio flow behavior in the G7 economies is best understood as a dynamic process shaped by changing risk perceptions, nonlinear adjustment mechanisms, and shifting states of financial vulnerability. The results therefore provide strong empirical support for the argument that the interaction between macro-financial risks and portfolio inflows is fundamentally state-dependent rather than constant over time.

Table 8: State-Dependent Transmission Patterns of Macro-Financial Risks on Net Portfolio Inflows across G7 Economies

Risk Factor	2010-20143	2015-2019	2020-2026	Decoupling Pattern
Liquidity Risk	Moderate negative response; fades after 2-3 horizons	Strong and persistent negative response	Highly nonlinear response with temporary overshooting and correction	Regime-Dependent Coupling
Fiscal Stance	Weak and statistically insignificant response	Significant negative response at medium horizons	Significant positive response driven by fiscal support measures	Decoupled → State-Coupled (Sign Switching)
Government Debt	Insignificant effect across horizons	Delayed negative response emerging after 3-4 periods	Immediate and persistent negative response	Progressive Coupling

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

Interest Rate Differential	Significant positive response across short horizons	Mild positive response with reduced persistence	Initial negative response followed by positive recovery effect	Horizon-Dependent Coupling
FX Volatility	Significant negative response with moderate persistence	Strong and persistent negative response	Sharp short-run negative response followed by stabilization	Persistent Coupling (Intensity Varies)

4.1 Synthesis of Findings

The empirical findings of the present research give an empirical answer to the paradox of conditional decoupling in the G7. The syntheses of dynamic responses, discrete thresholds, and tail dependencies help us conclude that the financial environment of G7 has been structurally metamorphosed in the past 15 years. Empirical evidence supports this assertion and shows that the so-called decoupling of portfolio investment flows due to macro-financial risk, i.e. that it is a regime-dependent illusion. In the 2010-2013 cycle, there was true decoupling in the G7 markets and supported by an unprecedented central-bank accommodation.

As a contrast, the 2020-2026 period is defined by tail-coupling. Our Copula-GARCH analysis shows that although flows seem independent in calm times (Upper Tail = 0.15), they become hyper-synchronized in crisis times (Lower Tail = 0.68). The thresholds of this sensitivity had been identified by the PTAR model, which was a debt-to-GDP ratio of 118.4 percent and a standardized FX volatility measure of 0.82.

Above these levels, the G7 can be said to change to a fragile, coupled regime as opposed to a resilient, decoupled regime. Due to the emergence of masked co-movement, the G7 policymakers should cease to rely on linear risk assessment. Our strategic interventions suggestions are: since benefits of diversification disappear in times of stress (tail -coupling), capital buffers that are macro prudential must be countercyclical and volatile-contingent. At the point of FX volatility of 0.82, the regulators ought to anticipate raising liquidity requirements to mitigate the expected synchronous outflow. We have found that the 118.4 % debt ratio is a psychological and structural impediment to investors.

The core to fiscal credibility anchors that G7 treasuries should focus on to ensure that debt-to-GDP expectations do not enter this tipping point should be used to stop abrupt re-coupling and capital flight. The proactive central-bank swaps lines are effective (Bahaj & Reis, 2021). They must be institutionalized as long term structures and not ad-hoc responses to crises. The stress testing should be Copula-GARCH based in central banks (Karimalis & Nomikos, 2017). Lower-tail dependency is not well considered in standard stress tests (Kole et al., 2007).

Simulating risks of synchronized asset class collapses can help regulators to be more prepared to Black-Swan events in which the conventional pull factors (e.g., interest-rate differentials) do not lure capital (Billio et al., 2012; Poledna et al., 2015). With the world no longer de-volatilized between G7 economies and the emerging markets of the past, a decoupling story has been debated, and evidence suggests a recoupling phase as a temporary halt over long-run decoupling. The relationship between macro-financial risk factors and portfolio flows in G7 economies shows dynamic shifts across different periods.

Liquidity Risk: Liquidity risk played a major role that was negative but temporary in determining the portfolio flows in the 2010-2013 period. This impact remained during the 2015-2019 period and became stronger and sustainable. During the 2020-2026, the liquidity risk was oscillatory and thus showed fluctuating impacts on the various sub-periods. In sum, the pattern of liquidity risk is

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

regime-dependent coupled, with its impact being substantial but changing with time, as market dynamics change.

Fiscal Stance: The fiscal stance was not relevant between 2010 and 2013, and it did not have a substantial effect on the portfolio flows. Nevertheless, it turned negative in 2015-2019, which was an expression of fiscal problems of that period. The fiscal stance in 2020-2026 showed a tremendous positive impact implying recovery or change in fiscal policy. This is an illustration of a shift between completely decoupled and coupled dynamics, whose pattern is that of sign-switching.

Government Debt: Government debt had no substantial influence between 2010 and 2013. As of 2015-2019, the debt effect took a negative turn with a delayed reaction, and in the 20202025, the negative effect was instant. The trend is in the change of decoupling to coupled, meaning that the role of government debt in the flows of all portfolios became more explicit and effective as time went by.

Interest Rate Differentials: The positive interest-rate difference between 2010 and 2014 was huge implying that portfolio flows were drawn to domestic rates. In 2015-2019 the relationship became weak and weakly positive. By 2020-2026, this effect reversed, and it became significant and negative then reversed to positive. This is an indication of a coupled-to-horizon coupled pattern, whereby the interest-rate differentials will affect the flows of portfolio with different degrees and directions of direction depending on the wider macro-financial environment.

Foreign Exchange Volatility: FX volatility was significantly negative in all the three periods, and the degree of volatility was different. The negative effect was large in 2010-2013 and it was higher in 2015-2019. The negative contribution of 2020-2026 was momentary, which means that although FX volatility continued to be a consistent source of portfolio flows, its magnitude was subject to changes based on the market environment. This is classified to be coupled, and its intensity varies in reaction to the global risk factors.

Finally, the analysis has shown that macro-financial risk factors have a varied impact on portfolio flows based on the economic regime. Portfolio flows were always accompanied by liquidity risk and FX volatility though their effects fluctuated over time. The fiscal position and government debt showed a decoupled-coupled dynamic, showing how the two factors change their impact with a different macroeconomic environment. The interest rate differentials had complex pattern and this was seen as the changing priorities of investors based on various economic phases.

5. DISCUSSION OF FINDINGS

The empirical findings show that portfolio-flow dynamics in the G7 economies are more complex and state-dependent, thus offering strong evidence to the major thesis of the study that the decoupling is state-dependent. The results align with the views of some recent scholars that were mentioned in the literature review. The research of Chen Liu and Liu (2024) on foreign exchange resilience shows that nonlinearities and threshold effects exist in their study. The findings of this study also aligns with those of Fetai et al. (2025) where it was examined debt through a threshold-dynamic analysis which showed hierarchical debt dynamics.

The regime-specific spill-overs are similar to the works of Chen & Tillmann (2025), whereas the central struggle of global risk as the agent of transforming sensitivities is promoted by the theories of Goldberg & Krogstrup (2018).The multi-method approach is effective in fulfilling the research

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

goals because it quantifies dynamic effects (LP), models nonlinearities (TAR) and analyzes current evidence, result in conducting policy implications as follows.

Baseline Regime (2010-2013): The flow of portfolios seemed independent of fiscal policy and the level of debt in the time of accommodative monetary policy and compressed risk premia. It is possible that this situation will give rise to an unhealthy complacency among policymakers that can lead to immediate market corrections once the fundamentals start to become unwell. Policymakers must understand that this benign neglect cannot be a consistent feature of mature economies; a recalibration to such a time would substantially underprice latent weaknesses, as Brandão-Marques et al. (2021) note.

Commodity Stress Regime (2015-2019): The exaggerated, overstated responses to liquidity, fiscal, and debt risk, and the greater dependence of tails, are evidenced by the fact that system-wide repricing in emerging markets requires reassessment of fundamentals in an unpredictable fashion.

The results are consistent with the nonlinear effects of external debt on economic growth noted by Elkhalfi et al. (2024), who found that while moderate external debt can initially stimulate growth, excessive accumulation generates diminishing returns and negative impacts. The implication for policymakers is that precautionary buffers and prudent debt management should be developed during calm periods, as the costs of adverse shocks are disproportionately higher during episodes of exogenous stress.

Policy Pivot Regime (2020-2026): this era signifies multidimensional recoupling and signal distortion. The dynamics of the post-COVID era are the most ambiguous and, in some cases, paradoxical. Sign-changing fiscal stance phenomenon and the initially negative reaction to increasing interest differentials suggest that the perception of macro-signals by the investors is now very context-specific. This is in agreement with the high-frequency macro-financial variables emphasized in the literature review.

There is a major signaling challenge on the part of policymakers: expansionary fiscal policy or a rise in rates can be viewed as either expansionary or contractionary, which could cause destabilizing and unstable flow reactions. According to oscillatory LP reactions, the market depth and algorithmic trading can now become the causes of overshooting and reversals. The results support the argument that policy silos exist. Liquidity risk has a stronger negative influence and prevails between regimes.

During times of crunch, the liquidity backstops given by central banks are very crucial in keeping the banking sector stable and in orderly portfolio flows. In addition, monetary regime and fiscal stance interplay are important. For 2015 and 2019, outflows were triggered by a fiscal deficit that was ignored in 2010 and 2013, and inflows in 2020 and 2026. This requires greater coordination of the activities of the ministries of finance and the central banks in order to control the overall signal which is being given by the international investor especially in cases of normalization.

The threshold-based debt-mechanisms suggest that the nonlinear risk should be integrated in the debt-sustainability analyses. Crossing a debt level or being subjected to an increase in global risk can lead to a discrete intensification of refinancing pressure through the portfolio-flow channel. It therefore follows that the debt-management authorities should focus on lengthening of maturity structures and nurturing of steady domestic-investor bases in the low-risk regimes in future so as to protect the public finances against unstable cross-border portfolio-flow risk that typify the high-risk regimes.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

The tail-dependent and persistent correlation with FX volatility is a quantifiable weakness. The mitigation process, which can be implemented, is an enhancement of the domestic-currency hedging markets and strengthening the market, motivating the wide range of non-bank liquidity providers, and having strong central-clearing counterparties. These operationalization are based on the resilience theoretical perspective exemplary formulated by Chen et al. (2024).

5.1. Policy Implications based on Findings

The combination of the findings of the three analytical tools provides a more subtle understanding of how macro-financial variables influence portfolio flows, allowing a more advanced classification that goes beyond a simplest coupled/decoupled duality. Liquidity risk is a consistent predictor of portfolio investment in all time regimes; it is highly amplified in high-risk regimes and demonstrates clear amplification.

The analysis also indicates that the tail dependence is quite significant in the times of financial stress; hence highlighting the importance of the fact that liquidity risk is not only a constant issue, but it becomes a dominant force during systemic crises. This result is consistent with an amplified coupling regime, which indicates that liquidity risk is always salient but with a far better explicative power in times of increased financial instability.

The fiscal position has a heterogeneous influence on portfolio flows within different time frames. This effect is statistically insignificant between 2010 and 2013. Later on, however, the fiscal stance becomes consequential, but its effects vary with the regime of the time. In high-risk periods, the fiscal position produces a detrimental effect on flows, and a moderate dependence of tails at stress periods.

Such a dynamic suggests a regime-conditional switching classification in which the fiscal position does not do much to influence the flows in normal situations but is coupled, sometimes negatively, in times of stress. Interestingly, the fiscal stance may draw flows in specific situations when viewed as growth-oriented.

The government debt also exhibits the temporally changing effects. There is a low impact in the previous years and high impact in the new periods after 2015 particularly in high-risk regimes where the high lower-tail dependence is realized. As a result the government debt acts as a latent vulnerability that can only become activated when certain risk thresholds are reached creating a threshold-activated coupling regime. Basically, government debt does not directly change the portfolio flows, but takes a preemptive role when the risk levels cross the predetermined thresholds.

Interest rate differentials have an increasingly complicated correlation with portfolio flows. The differential has a positive relation with flows during low-financial stress times but in high-risk times this relationship decays or becomes negative. This is complicated by the existence of moderate tail dependence.

The fact of the observation is consistent with a state-dependent, horizon-coupled classification, which means that interest rate differentials act in a conventional fashion in steady state times, but are decoupled (or even inverted) in stressful times. The long-run effect of the delayed coupling effect emerges, which reveals the sensitivity of the flows to interest rate differentials depending on the risk environment that exists.

The most stable and predictable force behind the flows of a portfolio is foreign exchange (FX) volatility which has always had a strong negative impact on all periods. Its effect is stronger in

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

high-risk regimes and it is highly tail dependent in financial times. In this regard, FX volatility would be classified in a persistently coupled category which would substantiate its effectiveness as a persistent and strong determinant of portfolio flows that increases in strength as world financial risks increase.

The research explains the moderating effect of disparate macro-financial risk factors on the flow of portfolio investment across the G7 economies, underlining the regime-conditioned nature of these relationships and varying in strength across times of financial crisis. It is important to note that G7 economies are yet to be decoupled fully until a certain point; this realization forms part of the ground work towards the systems that can withstand shocks and maintain stability even during a crisis.

Given the trade-off between the efficiency of integration and resilience, deep integration will be beneficial in smooth times due to the risk sharing and shock absorption (an incidental form of decoupling), whereas capital retrenchment at the time of global-risk events can be fast and synchronous(Milesi-Ferretti & Tille, 2011), while tail-coupling indicates increased joint risk (Paltalidis & Patsika, 2019).

Through analysis of threshold risks, TAR responses show empirical evidence of cliff effects; large adjustments in sensitivities to flows are activated by small degradations in fundamentals as approach to an estimated risk threshold (e.g., a composite index value of 0.65). Therefore, threshold variables should be closely followed by the macroprudential policy.

6. CONCLUSION

The aim of the study was to analyze the nonlinearity dynamics between macro-financial risk variables and portfolio investment flows in G7 economies, with the notion of state-dependent decoupling. Using a trivariate econometric model of panel local projections, threshold autoregressive models, and Copula-GARCH dependence modeling within three macro-financial regimes between 2010 and 2026, the analysis reveals that the relationship between portfolio flows and domestic fundamentals in the most developed economies is not always coupled or decoupled.

They are, on the contrary, sensitive to the dominating risk regime. In non-volatile, low-risk situations, flows seem to be immune to fiscal position and government indebtedness, and create a sense of invulnerability. Nonetheless when an amount of systemic-risk is exceeded, thematic sensitivities are magnified making fundamentals highly nonlinear and magnifying tail risks.

Furthermore, the interpretation of signals can invert during complex volatile regimes, e.g., in the post-COVID era, traditional drivers, e.g. interest differentials, can also act counter-intuitively in the short run. The implications of these findings are far-reaching: financial-stability practitioners must make use of regime-sensitive surveillance tools that have the ability to identify beyond-mean correlation, threshold sensitivities and tail dependencies.

The fiscal and monetary policymakers need to focus on effective institutional frameworks and policy coordination to ensure resiliency and destabilizing flows. Deep and liquid markets are not to be considered as an unrestricted channel to stability but as a buffer, which can run out when fundamentals are undermined in a global-risk shock.

In the end, the study confirms that in a world that is becoming more and more globalized financially, the opposition between stable developed economies and volatile emerging markets is not absolute.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

References

1) Abakah, E. J. A., Addo, E., Gil-Alaña, L. A., & Tiwari, A. K. (2021). Re-examination of international bond market dependence: Evidence from a pair copula approach. *International Review of Financial Analysis*, *74*, 101678–101678. https://doi.org/10.1016/j.irfa.2021.101678

2) Adamek, R., Smeekes, S., & Wilms, I. (2024). Local projection inference in high dimensions. *Econometrics Journal*, *27*(3), 323–342. https://doi.org/10.1093/ectj/utae012

3) Affairs, U. N. D. of E. and S. (2024). Global monetary tightening: Risks and challenges. In *World economic situation and prospects/World economic situation and prospects ...* (pp. 47–86). United Nations. https://doi.org/10.18356/9789213586440c007

4) Almeida, D. T. L. de. (2022). Methodological development of consequential Life Cycle Assessment applied to the construction sector. *HAL (Le Centre Pour La Communication Scientifique Directe)*. https://pastel.hal.science/tel-04045363

5) Bahaj, S., & Reis, R. (2021). Central Bank Swap Lines: Evidence on the Effects of the Lender of Last Resort. *The Review of Economic Studies*, *89*(4), 1654–1693. https://doi.org/10.1093/restud/rdab074

6) Banerjee, R., Devereux, M. B., & Lombardo, G. (2016). Self-oriented monetary policy, global financial markets and excess volatility of international capital flows. *Journal of International Money and Finance*, *68*, 275–297. https://doi.org/10.1016/j.jimonfin.2016.02.007

7) Billio, M., Getmansky, M., Lo, A. W., & Pelizzon, L. (2012). Econometric measures of connectedness and systemic risk in the finance and insurance sectors. *Journal of Financial Economics*, *104*(3), 535–559. https://doi.org/10.1016/j.jfineco.2011.12.010

8) Brandão-Marques, L., Gelos, G., Narita, M., & Nier, E. (2021). Leaning Against the Wind: An Empirical Cost-Benefit Analysis. *SSRN Electronic Journal*. https://autopapers.ssrn.com/sol3/papers.cfm?abstract_id=3783908

9) Caporin, M., Rodríguez-Caballero, C. V., & Ruiz, E. (2024). The factor structure of exchange rates volatility: global and intermittent factors. *Empirical Economics*, *67*(1), 31–45. https://doi.org/10.1007/s00181-023-02542-3

10) Chaikina, A. (2025). Essays on Optimal Monetary Policy under Fiscal Pressure. *Deep Blue (University of Michigan)*. https://doi.org/10.7302/27242

11) Chen, C. W. S., Liu, F.-C., & So, M. K. P. (2011). A review of threshold time series models in finance [Review of *A review of threshold time series models in finance*]. *Statistics and Its Interface*, *4*(2), 167–181. Lehigh University. https://doi.org/10.4310/sii.2011.v4.n2.a12

12) Chen, H., & Tillmann, P. (2025). Monetary policy spillovers: Is this time different? *Journal of International Money and Finance*, *152*, 103278–103278. https://doi.org/10.1016/j.jimonfin.2025.103278

13) Chen, L., Liu, E. X., & Liu, Z. (2024). FX resilience around the world: Fighting volatile cross-border capital flows. *International Review of Financial Analysis*, *96*, 103753–103753. https://doi.org/10.1016/j.irfa.2024.103753

14) Ciravegna, L., Hartwell, C. A., Jandhyala, S., Tingbani, I., & Newburry, W. (2023). Geopolitics in International Business: Challenges and Insights. *AIB Insights*, *23*(1). https://doi.org/10.46697/001c.70428

15) Cottrell, S., Delpachitra, S., Ma, Y., Yu, X., & Jiang, P. (2023). Does Us Sovereign Default Risk Drive Global Interbank Funding Risk? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4384852

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

16) Das, N. M., Rout, B. S., & Khatun, Y. (2023). Does G7 Engross the Shock of COVID 19: An Assessment with Market Volatility? *Asia-Pacific Financial Markets*, *30*(4), 795–816. https://doi.org/10.1007/s10690-023-09398-8

17) Dritsaki, M., & Dritsaki, C. (2023). The Relationship between Health Expenditure, CO2 Emissions, and Economic Growth in G7: Evidence from Heterogeneous Panel Data. *Journal of the Knowledge Economy*, *15*(1), 4886–4911. https://doi.org/10.1007/s13132-023-01349-y

18) Elsayed, A. H., Hammoudeh, S., & Sousa, R. M. (2021). Inflation synchronization among the G7and China: The important role of oil inflation. *Energy Economics*, *100*, 105332–105332. https://doi.org/10.1016/j.eneco.2021.105332

19) Espoir, D. K., Sunge, R., & Bannor, F. (2023). Exploring the dynamic effect of economic growth on carbon dioxide emissions in Africa: evidence from panel PMG estimator. *Environmental Science and Pollution Research*, *30*(52), 112959–112976. https://doi.org/10.1007/s11356-023-30108-4

20) Ferreira, L. N., Miranda-Agrippino, S., & Ricco, G. (2023). Bayesian Local Projections. *The Review of Economics and Statistics*, *107*(5), 1424–1438. https://doi.org/10.1162/rest_a_01334

21) Fetai, F., Fetai, B., & Qabrati, I. (2025). Nonlinear public debt effect on economic growth: a dynamic panel threshold method. *Journal of Economic Studies*, 1–12. https://doi.org/10.1108/jes-07-2025-0544

22) Ghosh, A. R., Kim, J., Mendoza, E. G., Ostry, J. D., & Qureshi, M. S. (2011). *Fiscal Fatigue, Fiscal Space and Debt Sustainability in Advanced Economies*. https://doi.org/10.3386/w16782

23) Goldberg, L. S., & Krogstrup, S. (2018). International Capital Flow Pressures. In *National Bureau of Economic Research*. https://doi.org/10.3386/w24286

24) Gupta, C., & Jain, A. (2022). A Study of Banks' Systemic Importance and Moral Hazard Behaviour: A Panel Threshold Regression Approach. *Journal of Risk and Financial Management*, *15*(11), 537–537. https://doi.org/10.3390/jrfm15110537

25) Hansen, B. E. (1999). Threshold effects in non-dynamic panels: Estimation, testing, and inference. *Journal of Econometrics*, *93*(2), 345–368.

26) Icard, A., & Turner, P. (2019). Managing Global Liquidity as a Global Public Good. A Report of an RTI Working Party. *RePEc: Research Papers in Economics*. https://ideas.repec.org/p/afh/wpaper/1293.html

27) Ilzetzki, E., Reinhart, C., & Rogoff, K. (2020). Will the Secular Decline in Exchange Rate and Inflation Volatility Survive COVID-19? *Brookings Papers on Economic Activity*, *2020*(3), 279–332. https://doi.org/10.1353/eca.2020.0030

28) Kalemli-Özcan, Şebnem, & Varela, L. (2019). Exchange Rate and Interest Rate Disconnect: The Role of Capital Flows, Currency Risk and Default Risk. *RePEc: Research Papers in Economics*. https://econpapers.repec.org/RePEc:red:sed019:351

29) Karimalis, E., & Nomikos, N. K. (2017). Measuring systemic risk in the European banking sector: a copula CoVaR approach. *European Journal of Finance*, *24*(11), 944–975. https://doi.org/10.1080/1351847x.2017.1366350

30) Kimani, E. M., Ngunyi, A., & Mung'atu, J. (2023). Modelling Dependence of Cryptocurrencies Using Copula Garch. *Journal of Mathematical Finance*, *13*(3), 321–338. https://doi.org/10.4236/jmf.2023.133020

31) Kole, E., Koedijk, K., & Verbeek, M. (2007). Selecting copulas for risk management. *Journal of Banking & Finance*, *31*(8), 2405–2423. https://doi.org/10.1016/j.jbankfin.2006.09.010

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 06:2026
DOI: 10.5281/zenodo.20569728

32) Kundu, S., & Paul, A. (2022). Effect of economic policy uncertainty on stock market return and volatility under heterogeneous market characteristics. *International Review of Economics & Finance*, *80*, 597–612. https://doi.org/10.1016/j.iref.2022.02.047

33) Menkhoff, L., Sarno, L., Schmeling, M., & Schrimpf, A. (2012). Carry Trades and Global Foreign Exchange Volatility. *The Journal of Finance*, *67*(2), 681–718. https://doi.org/10.1111/j.1540-6261.2012.01728.x

34) Milesi-Ferretti, G.-M., & Tille, C. (2011). The great retrenchment: international capital flows during the global financial crisis. *Economic Policy*, *26*(66), 289–346. https://doi.org/10.1111/j.1468-0327.2011.00263.x

35) Paltalidis, N., & Patsika, V. (2019). Asymmetric dependence in international currency markets. *European Journal of Finance*, *26*(10), 994–1017. https://doi.org/10.1080/1351847x.2019.1650089

36) Pesaran, M. H., Smith, L. V., & Yamagata, T. (2013). Panel unit root tests in the presence of a multifactor error structure. *Journal of Econometrics*, *175*(2), 94–115. https://doi.org/10.1016/j.jeconom.2013.02.001

37) Poledna, S., Molina-Borboa, J. L., Martínez-Jaramillo, S., Leij, M. van der, & Thurner, S. (2015). The multi-layer network nature of systemic risk and its implications for the costs of financial crises. *Journal of Financial Stability*, *20*, 70–81. https://doi.org/10.1016/j.jfs.2015.08.001

38) Srivastava, D. K., Kapur, T., Bharadwaj, M., & Trehan, R. (2020). Impact of Covid-19 on Global Debt: A Study of Countries in the G-20 Group. *Modern Economy*, *11*(12), 2101–2121. https://doi.org/10.4236/me.2020.1112139

39) Svoboda, A. (2023). The Impact of COVID-19 on the Financial System. *International Journal of Management Studies and Social Science Research*, *5*(5), 148–156. https://doi.org/10.56293/ijmsssr.2022.4712

40) Taghizadeh-Hesary, F., Yoshino, N., Abadi, M. M. H., & Farboudmanesh, R. (2015). Response of macro variables of emerging and developed oil importers to oil price movements. *Journal of the Asia Pacific Economy*, *21*(1), 91–102. https://doi.org/10.1080/13547860.2015.1057955

41) Virbickaitė, A., Ausín, M. C., & Galeano, P. (2013). Bayesian inference methods for univariate and multivariate garch models: a survey. *Journal of Economic Surveys*, *29*(1), 76–96. https://doi.org/10.1111/joes.12046

42) Westerlund, J. (2007). Testing for Error Correction in Panel Data*. *Oxford Bulletin of Economics and Statistics*, *69*(6), 709–748. https://doi.org/10.1111/j.1468-0084.2007.00477.x